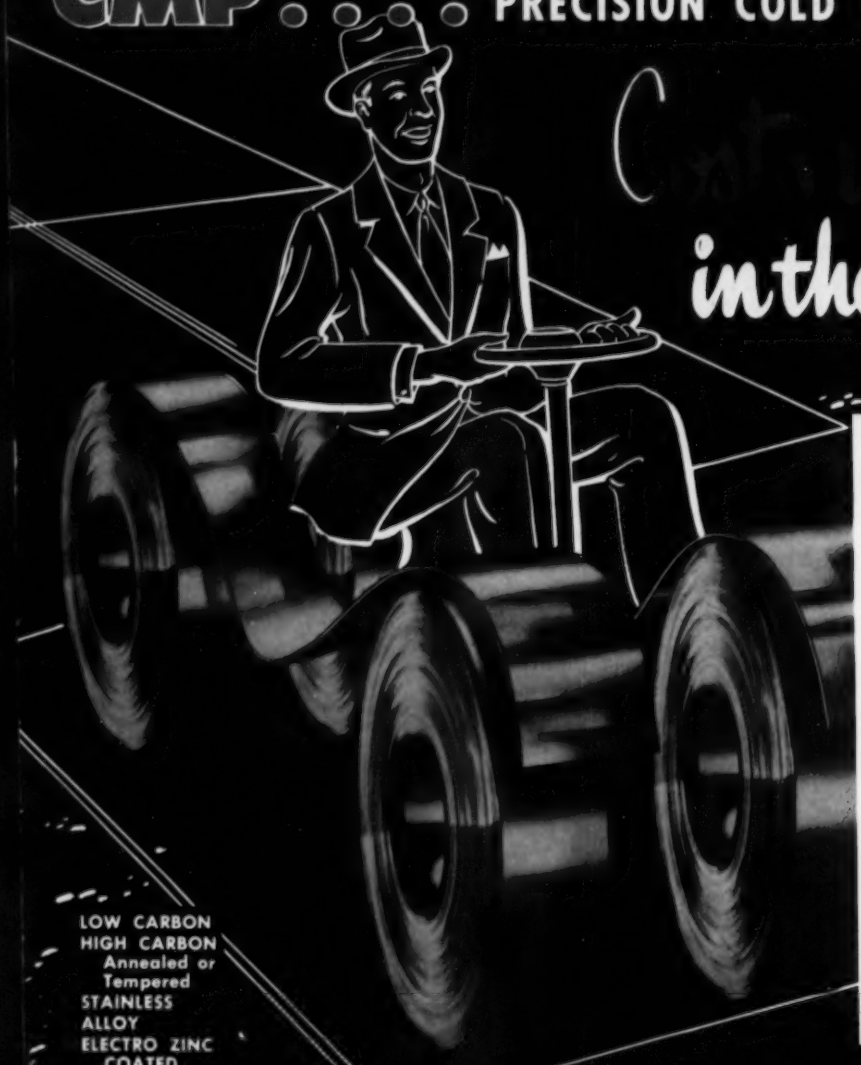
the Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • FEBRUARY 10, 1955

Special Report
On Defense
Spending
See page 51

CMP PRECISION COLD ROLLED STRIP STEEL



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in the long run

Mileage from your cold rolled strip steel can be measured several ways and when you figure production costs accurately, there are charges such as length of die life, rejects, down-time, component assembly, etc., that add to your first cost of the steel.

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ELECTRO ZINC COATED

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SALES OFFICES: New York • Cleveland • Detroit • Indianapolis
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BETHLEHEM STEEL

the Iron Age

Vol. 175, No. 6, February 10, 1955

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NEWS DEVELOPMENTS

WHAT DEFENSE SPENDING MEANS TO INDUSTRY—P. 51

New Federal budget may or may not accurately predict future national security expenditures. And current sensitive spots have further clouded the outlook. To get a simple yet guiding interpretation, IRON AGE Editor Tom Campbell has interviewed top defense officials. Here are some of the points to note: Pentagon estimates may be too low. Defense spending has reached its bottom. But a limited shooting war in Formosa wouldn't cause a big boost.

WAGE AND HOUR LAW STILL A HEADACHE — P. 56

Violations of the Wage-Hour Law are turning up in half the companies investigated. Minimum pay, exemptions, hourly rates and bonuses are common problem areas. Broad coverage includes most metalworking. This article, written by a former government wage-hour official, tells you what to watch out for; it points out where most violations occur.

PREDICT BIG YEAR FOR ATOMIC WEAPONS — P. 62

A flock of nuclear weapons will go into development, testing or completion stages in fiscal 1956, says AEC in a recent report. H-bomb power may be tripled, atomic warheads for guided missles will be tested as new program gives more attention to development.

NEW PLANT, EQUIPMENT OUTLAYS WILL BE UP — P. 65

Most of the experts have predicted that new plant and equipment expenditures this year would be down from last year's $26.7 billion level. But the odds are these forecasts are overly pessimistic. What's been overlooked is that stiffening competition is forcing manufacturers to find new ways to cut costs, diversify output, improve quality. It means that though less will be spent on ways to increase production, more will be spent to improve quality.

PACKARD FIRST TO USE PLASTIC DIES — P. 68

Automaker uses plastic dies to form body panels for luxury Packard hardtop. Savings in time and cost enabled firm to make release deadline impossible with steel dies. The 60 pct savings in tooling costs may enable independent automakers to change styles frequently, keep up with competition.

IN METALWORKING

ENGINEERING & PRODUCTION

STUDY POINTS WAY TO PREVENT GALLING — P. 91
Galling and seizing of titanium, either in use or in machining and drawing operations have hindered application and ability to work the metal. Basic data gathered in a study point the way to new methods for protecting titanium and other metals from galling and seizing. Selection of metal pairs and hardness of the matrix supporting the film are important factors.

RUBBER-BASE ADHESIVE SOLVES PROBLEM — P. 94
Finding a suitable process or material for bonding carbide files to their backings presented a major problem. Brazing was out of the question because of differences in coefficients of expansion and contraction of carbide and steel. A rubber-base adhesive provided the answer. It not only meets all strength requirements, but has a simple and short curing cycle.

SINGLE DIE FORMS, FASTENS TERMINALS — P. 98
Brass terminals are formed and fastened to wire ends in a single progressive die setup. The system supplants use of either swaged and soldered or costly preformed terminal strips. It saves $100,000 yearly.

REDESIGN BOOSTS STRENGTH OF CYLINDER — P. 100
Compressor cylinder castings used in natural gas transmission service must stand up under continued working pressures of 1200 psig. Formerly a borderline case where steel castings were generally used, these cylinders can now be made of high-strength cast iron. Redesign proved most important in boosting strength.

MULTI-PURPOSE GREASE EASES MAINTENANCE—P. 104
One of the new lithium-base greases makes blast furnace maintenance easier and cheaper. It combines the water and temperature-resistance properties of special-purpose types. Single formula simplifies application and inventory. It also cuts maintenance costs.

MARKETS & PRICES

OIL COUNTRY PRODUCTION, SHIPMENTS RISE — P. 54
Tube mills are operating at higher rates—some at capacity—despite decline in drilling and comfortable consumer stocks. Buying is up but a bigger factor is stocking of in-transit depots.

AIRCRAFT FIRM BRANCHES INTO NEW FIELDS — P. 59
Diversification in production is keynote of Curtiss-Wright entry into five new production areas. Ultrasonics, electronics, radiation instrumentation, a new line of plastics and industrial TV set the pace.

STEEL ORDER BULGE COMING IN MARCH — P. 139
With steel ordering at a high pitch currently there is still more to come. Demand is building up for all steel products with a peak coming in March. Big item on the dope sheet is plate. But other items such as bars, wire and tinplate are creeping up. The result of all this will be a bulging second quarter in steel with tightness spilling over from the flat-rolled picture to other products. Export demand is sparking semi-finished and flat-rolled tonnage.

BUYERS RECHECK STEEL INVENTORIES — P. 140
New orders coming into steel sales offices have taken a substantial jump in the past week to 10 days. The Formosa situation and labor uncertainties merely sharpen the edge of an already tight steel market. Market would be strong without them.

BAN EXPORT OF DOMESTIC PRIMARY COPPER — P. 146
The government has forbidden the export of domestic primary copper and sharply limited the export of copper scrap. This action had been mentioned as a possibility and anticipation of the move had already boosted London copper prices to new record levels. Commerce Secretary Weeks is scrutinizing the situation and there may be a recommendation that stockpile copper be released to ease supply.

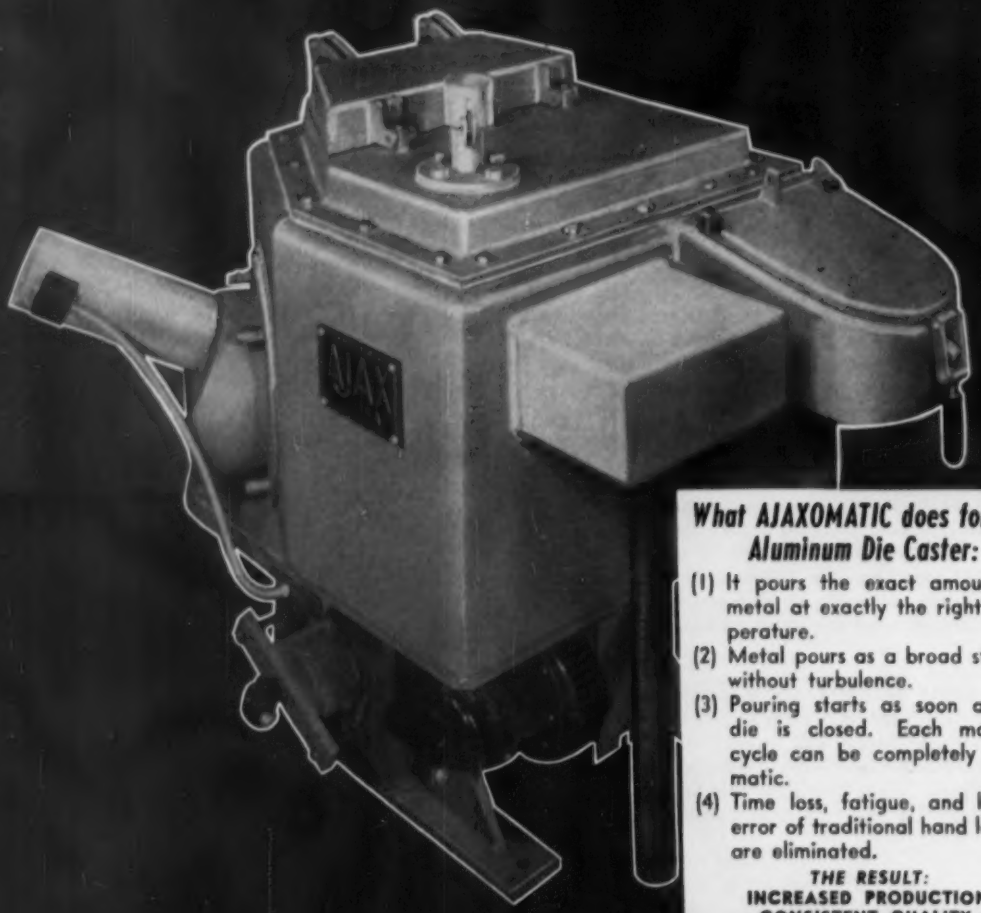
NEXT WEEK:

CAST 150-TON FORGING INGOTS BY VACUUM METHOD
Forging ingots weighing up to 150 tons and virtually hydrogen free are being vacuum cast commercially in Germany by what is essentially a low-pressure degassing method. Metallurgical quality has improved substantially and manufacturing costs reduced sharply. Extensive slow cooling periods and lengthy heat treatments have been largely eliminated.

PLANNED PIPELINES WILL BOOM PLATE DEMAND
Insatiable demand for oil and gas will help keep steel order books filled for years. Planned pipeline requirements should mean 1.5 million ton per year demand for eletericweld pipe alone over the next 5 years, it is estimated. The 2240-mile Trans-Canadian and the 2600-mile Canada-California pipelines are whoppers scheduled to get under way this spring.

AJAXOMATIC

AN AUTOMATIC POURING UNIT FOR THE PRODUCTION OF ALUMINUM DIE CASTINGS



What AJAXOMATIC does for the Aluminum Die Caster:

(1) It pours the exact amount of metal at exactly the right temperature.

(2) Metal pours as a broad stream without turbulence.

(3) Pouring starts as soon as the die is closed. Each machine cycle can be completely automatic.

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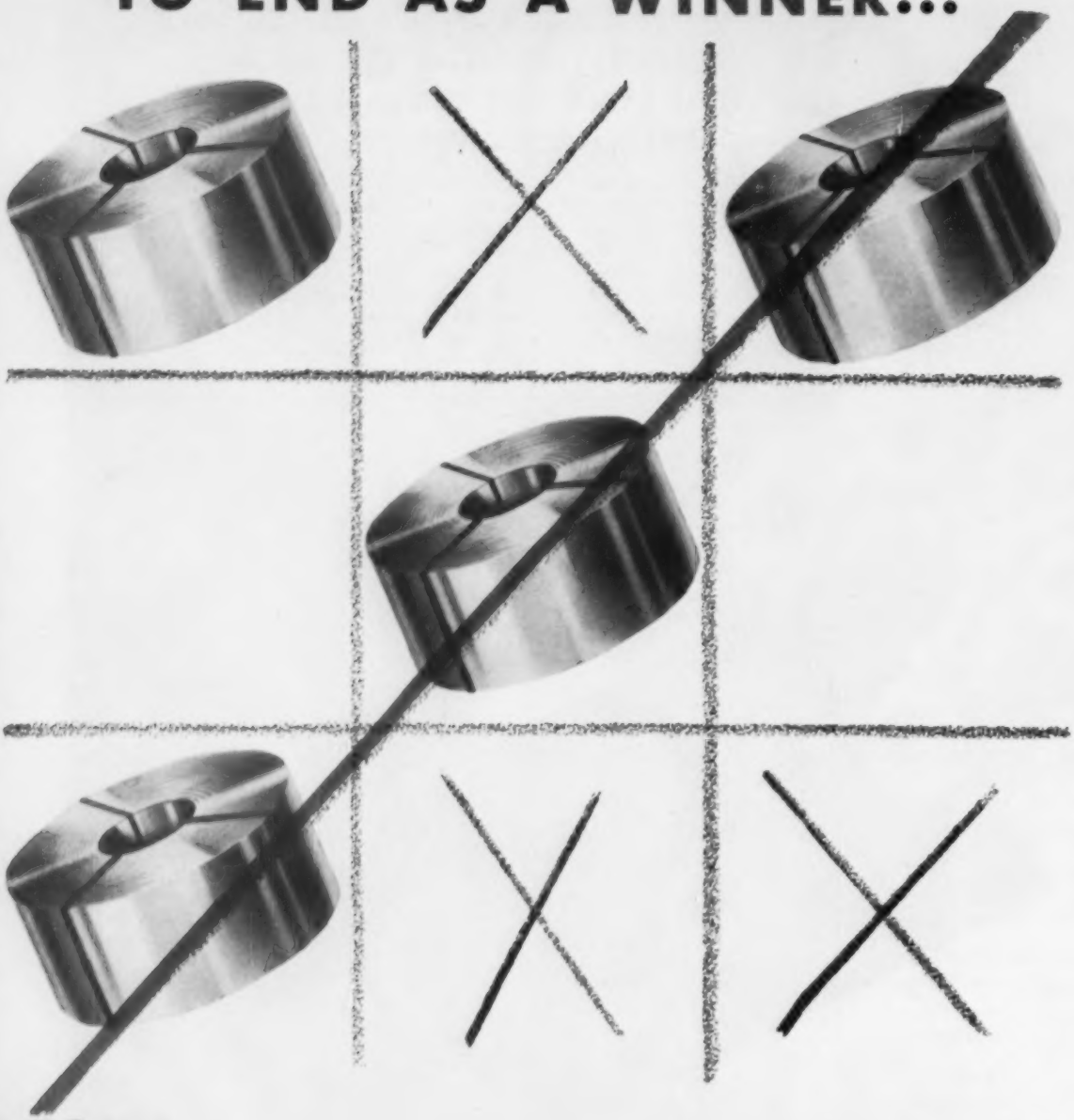

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Indexed in the Industrial Arts Index and the Engineering Index.

EFA NBP

Editorial:

No Time For A Doublecross

PRESIDENT EISENHOWER is deadly serious when he says we will fight to protect Formosa. He has made this so plain there should be no misunderstanding among the Reds—or among any of our allies. If there is war Red China will have blundered into it.

But all the while the President has been making clear our stand with Nationalist China and our efforts to keep the Reds from rolling closer to Asiatic domination ugly rumors have been spreading.

There are disturbing reports that the British favor some kind of a United Nations deal which would bring about two Chinas—and eventually only one China; a Red one. For us to subscribe to that would be to doublecross the Chinese Nationalists and to send Chiang Kai-shek and Free Chinese into limbo.

For President Eisenhower to agree to a "neutralization" of Formosa or to say publicly that we will not defend Quemoy and Matsu would cause a crisis at home. And abroad such commitments—or even a hint of them—would play into the hands of the Chinese Reds and would suit the Kremlin.

There appears to be plenty of back room diplomacy now going on. The result of this is supposed to bring about a cease-fire in the Formosan Strait. It looks as if Britain and India are the prime movers in this palaver. If such talks were to result in a cease-fire accompanied by a status quo in the Formosan situation there would be little cause for suspicion or anxiety.

But when there are rumors and indications that a move is underway—consciously or unconsciously—which may result in selling Chiang down the river that is something else again.

The Chinese Reds are aggressors. Their leaders are brutal and unconscionable dictators. President Eisenhower knows this. And no one in the Administration is being fooled by the threats of Red China, or the doubletalk of Red Russia. Nor are leaders such as Senator Knowland ready to stand still for a cave-in to the Chinese Reds—or to allies who take lightly our stand on Formosa.

The President has said that Formosa is part of our defense picture. That is telling the world where we stand. This is no time for us to doublecross Nationalist China—and this is no time to let Red China again doublecross the free nations.

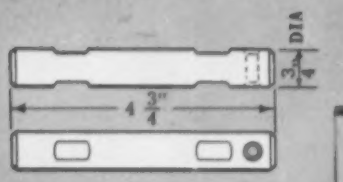
Tom Campbell

EDITOR

THERE'S ONLY ONE WAY TO DO A JOB BEST... Another Production Solution

by MOTCH & MERRYWEATHER!

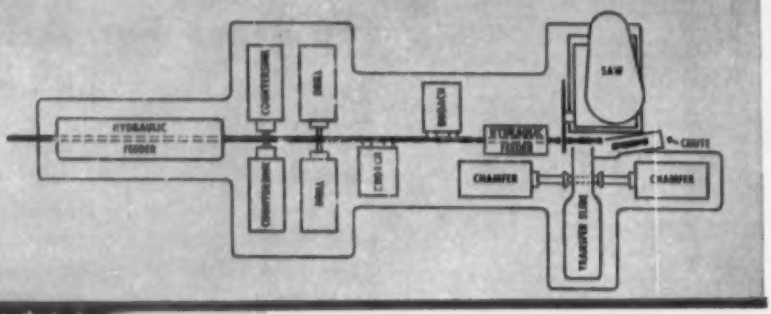
THE JOB TO BE DONE

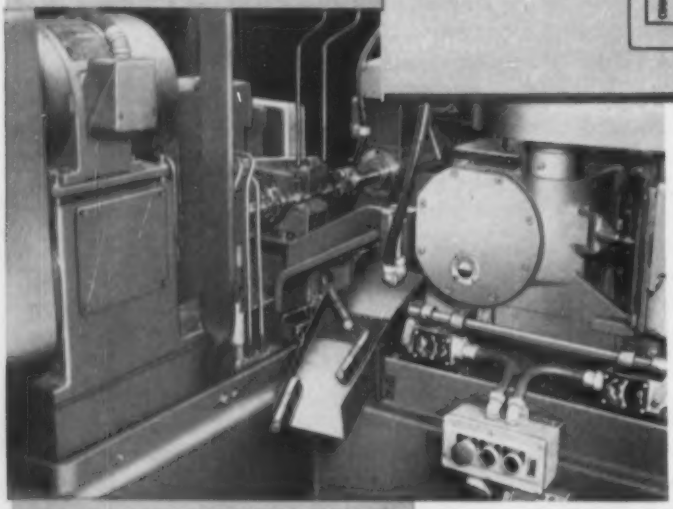


Part: Differential pinion shaft.

Operations: Countersink, drill, broach two sides, Triple-Chip cut off, and chamfer both ends.

HOW M & M DID IT BEST





M & M attained production of 300 pieces per hour at 100% efficiency.

Again, the one best answer is by a Motch & Merryweather in-line automatic transfer machine, designed and built for this one purpose. In-line speedy progression — no wasteful starting and stopping — stock clamping at each station — automatic stock bar loading can be added for complete automation. *Result:* rapid fire production that quickly pays out. This in-line machine is but one illustration of a production solution by Motch & Merryweather.

Ask us now for any production-machining aids. No obligation.

By combining operations, production was increased with a minimum of floor space and labor required.

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MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

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dear editor:

letters from readers

I.Q. and You

Sir:

With your kind permission, we would like to reproduce in our monthly publication "The Punch," which is strictly an internal house organ distributed to our stockholders and our employees, your very excellent editorial entitled "Einstein, Plumbers, I.Q. and You" which appeared in the Dec. 30 issue of THE IRON AGE.

Should you grant this permission, you may be sure that the article will be credited to you as Editor of THE IRON AGE. *W. J. Stewart, Advertising Manager, The Cleveland Punch & Shear Works Co., Cleveland.*

No Iron Curtain

Sir:

The lead article in the Dec. 30 issue of THE IRON AGE entitled "STEEL: Red Output Soars as U. S. Slumps" lists Austrian ingot and castings production with that of Russia and its satellites. The text further implies that Austria is in the Iron Curtain bloc "even though part of the country is occupied by Western powers."

So far as steel production is concerned, this is a totally wrong picture of Austria's position, and I would like to call your attention to the error by citing the following facts:

1. Almost the entire crude steel production (i.e. ingots and castings) in Austria is in the U. S. and British occupation zones. This production is no less available to the West, nor more available to the East, than is that of any West European country.

2. The only steel producer in the Soviet occupation zone is a unit of the Schoeller-Bleckmann Stahlwerke A.G. which, however, contributed only 4.5 pct to Austria's crude steel production. But even this plant is under complete Austrian management and control. It is not under any obligation to supply Russia.

3. Although the Soviet occupation has adversely affected the Austrian economy, this has had no bearing on the Austrian steel industry since the plant dismantling which occurred after World War II.

4. The Austrian steel industry has received considerable economic and technical assistance from the United States Government under the Marshall Plan. This aid would not have been forthcoming, of course, if the resulting steel production were sent to the East . . . *R. S. McCaffery, Jr., United States of America Operations Mission to Austria, Vienna, Austria.*

We are sorry to have credited total Austrian steel production to the Reds when but 5 percent probably finds its way into their hands. Friendly Austrians may be assured that the next report will show their steel output is in the Free World status. —Ed.

Metal Protection

Sir:

On the Newsfront page of your Jan. 27 issue, you discuss a new coating for protecting metal finishes. Any information which you may be in a position to supply concerning a source for the material will be appreciated. *C. E. Warnes, President, Alloy Fabricators, Inc., Lodi, Ohio.*

Details on the new coating may be obtained from the H. A. Montgomery Co., 17191 Swift Ave., Detroit, Mich.—Ed.

Prepolished Steel

Sir:

I refer to the Newsfront on p. 37 of your issue of Jan. 20. Please indicate where I can get more information on a process mentioned in a short paragraph entitled: "Prepolished hot rolled steel." *R. M. Reichl, R. M. Reichl Co., Forest Hills, Long Island, N. Y.*

The firm referred to is the Acme Mfg. Co., 1400 East 9 Mile Road, Detroit 20 (Ferndale), Mich. Address your inquiry to Mr. George Carlson, Vice-President.—Ed.

What does "S. B." mean to you?

To some, it means "Soap Box" . . . the proverbial platform for platitudes. But, to thousands of designers and manufacturers, it means "Small Balls" by Universal, assuring true roundness and accuracy, so often despaired of in anything so microscopic.

Naturally, we make the larger balls, too, but we hope you'll get to know us through our Small Balls . . . a Sure Bet all around. Give us a chance to tell the Universal story.

Universal Ball co.

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MONTGOMERY CO., PA.

THERE'S ONLY ONE OIL "just as good"

When you're offered substitutes for Gargoyle D.T.E. Oils, remember these facts—

We're mighty proud that, so many times, you're told some other oil is "just as good as Gargoyle D.T.E." This is high praise—additional proof that Gargoyle D.T.E. hydraulic oils set the *standard of performance* in their field!

Gargoyle D.T.E. oils are uniformly high in quality—have been continuously improved for over 60 years to meet advanced machine designs. Premium products, their initial cost is only slightly higher than ordinary oils—often only about *one mill per hour* of machine operation!

Actually, Gargoyle D.T.E. hydraulic oil is more economical in the long run because... 1) it lasts longer—has stayed in service for thousands of hours in many cases... 2) increases machine efficiency... 3) improves production... 4) reduces manufacturing costs.

Remember, too, you get the world's greatest lubrication engineering service—*at no extra cost*—when you insist on Gargoyle D.T.E. oil. Why accept less? Call us today!

SOCONY-VACUUM

SOCONY-VACUUM *Correct Lubrication*

FIRST STEP IN CUTTING COSTS

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

fatigue cracks

by William M. Coffey

More Predictions

If you had been in Columbus, Ohio on Jan. 26 and if you had picked up the *Columbus Dispatch* of same date and if you had strayed from the funnies to the financial section to check how Krobnies Preferred was doing, low and beholden you would have seen a big picture of IRON AGE Editor-in-Chief Tom Campbell doing the usual—predicting again. As you know we keep a careful watch on all IRON AGE predictions—in your interest. We report from time to time how well they come out. We are known as the Editor's Conscience around here. So here are a few more of Tom's predictions which we are filing away and will carefully check one year from now. You will get a full report.

Tom told the Industrial Advertisers Assn. and the Advertising Club of Columbus that:

. . . steel ingot output for 1955 will exceed 100 million tons, compared to 88.3 million in 1954 . . . the odds are against a steel strike in 1955 but they favor a moderate wage increase and a medium-sized price increase for steel products . . . machine tool and machinery business will show a substantial improvement this year . . . railroad buying which creates a strong impact on the metalworking industry will be heavier this year . . . and some other things. All in all Tom sees peak levels for metalworking.

Just file this—but don't forget. And in the meantime you can count on it.

More Editors

The first mass-produced consumer product made of magnesium sheet rolled off Shwayder Bros. assembly lines and into the hands of another IRON AGE roving editor the other day. He reports that he and 399 other editors . . . but let him tell it in his very own words:

"Egad, it all comes back to me. Elegant setup in St. Regis Hotel penthouse to introduce Ultralite Samsonite luggage. About 400 editors, reporters, and fashion writers (these you can tell by the hats). Top brass from Dow (you'll excuse the expression) presented magnesium ingot to top brass from Shwayder. (Latter claims to make 25 pct of all luggage in U. S.). Reason for excitement is that Dow has a pretty good customer lined up making brand new line of luggage using magnesium sheet to which polyvinyl chloride sheet is bonded by U. S. Rubber's new Marvibond process. And such colors! My dieu! Airline Gray, Flight Blue, Vapor White and Pilot Tan. Vapor White looks like white; Pilot Tan looks like pilots on the Miami run. Men's come in Jet Gray, which looks like Charcoal Gray and Rocket Brown looks like no rocket we ever saw." So there you have it.

Puzzlers

Mr. Jack Rossman writes that the government printed a circular in 1927 (re: our Dec. 30 Water-Gas-Electricity puzzler) that said it is impossible to hitch all three lines up to all three houses without crossing lines—one line has to go through the houses. After going a little nutty ourselves we'll take this for the right answer. A good try by all—Ken Hofer, Joe Brugman, Edmund D. Sickels, Isay Stemp, Charlsie, etc., and I. M. Darey who used a well, a private generator and bottled gas!

New Puzzler

It takes 7 men 7 days to dig 7 holes. How long would it take one man to dig a half of a hole? Many thanks to Mr. C. L. Adams of Manistee, Michigan, for this noble puzzler. Warning: If you aren't hot with differential equations we suggest you leave this one alone.

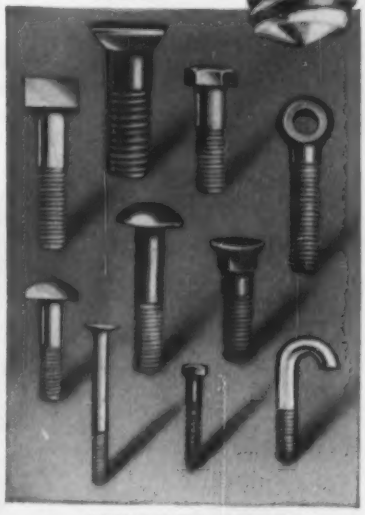
Threaded Specialties

lower cost
EYE BOLTS
by an
exclusive method

Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket eye bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

PAWTUCKET
MANUFACTURING COMPANY
327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

AIR engineering at work
REPORT No. 4271.10

Slugger "Pinch-hits" for Battering Ram...

SAVES $13,000...

Six men spent 21 hours removing nuts from 54 five-inch diameter bolts on this hydro-generator rebuilding job. An 800 lb. battering ram was used to remove the nuts, which held three drive shaft couplings together between water wheel and generator.

It took seven men another 24 hours to tighten the same nuts with the battering ram. Down time on the generator cost $300 per hour. The problem was how to run the nuts faster and with less manpower.

AIR engineering was put to work. A Size 588 Slugger Impactool "pinch-hit" for the battering ram. Two men then removed all the nuts in 1¾ hours, and put them on again in 2 hours, saving 286½ manhours and 41¼ hours down time. With nearly $13,000 saved on its first job, the Slugger now has a "full-time" job.

AIR engineering Manual

Over 100 interesting and helpful case history applications of AIR engineering at work.

If you in any way influence production or maintenance cost-savings in your plant, it will pay you to see I-R's confidential manual of reports on "AIR engineering at work". Write on your company letterhead, and we'll make arrangements for you to see it soon.

Ingersoll-Rand
11 Broadway, New York 4, N. Y.

Size 588 Slugger Impactool removing nuts from 5" dia. bolts.

8-148

dates to remember

FEBRUARY

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS—Annual meeting, Feb. 14-17, Conrad Hilton Hotel, Chicago. Institute headquarters are at 29 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Founding Anniversary meeting, Feb. 16, New York. Society headquarters are at 29 W. 39th St., New York.

DROP FORGING ASSN.—Winter Industry meeting, Feb. 17-18, Statler Hotel, New York. Association headquarters are at 605 Hanna Bldg., Cleveland.

EXPOSITIONS

NATIONAL ASSN. OF CORROSION ENGINEERS—Annual meeting and Show, Mar. 7-11, Palmer House, Chicago. Association headquarters are at 1061 M & M Bldg., Houston.

AMERICAN SOCIETY FOR METALS—Western Metal Exposition and Congress, Mar. 28-Apr. 1, Pan Pacific Auditorium, Los Angeles. Society headquarters are at 7201 Euclid Ave., Cleveland.

NATIONAL MACHINE TOOL BUILDERS' ASSN.—Machine Tool Show, Sept. 6-17, International Amphitheatre, Chicago. Association headquarters are at 2071 E. 102nd St., Cleveland.

MARCH

PORCELAIN ENAMEL INSTITUTE—Pacific Coast conference, Mar. 10-11, Biltmore Hotel, Los Angeles. Institute headquarters are at Dupont Circle Bldg., 1346 Connecticut Ave., N. W., Washington, D. C.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 14-15, Drake Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

AMERICAN SOCIETY OF TOOL ENGINEERS—Annual meeting, Mar. 14-18, Shrine Auditorium and Exposition Hall, Los Angeles. Society headquarters are at 10700 Puritan Ave., Detroit.

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—Annual convention, Mar. 20-22, The Conrad Hilton Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

INTERNATIONAL ACETYLENE ASSN.—Annual spring convention, Mar. 22-24, Shamrock Hotel, Houston. Association headquarters are at 30 E. 42nd St., New York.

AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Spring meeting, Mar. 25-26, The Greenbrier, White Sulphur Springs, West Va. Association headquarters are at 1900 Arch St., Philadelphia.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Annual meeting, Mar. 29-31, Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.

APRIL

AMERICAN HARDWARE MANUFACTURERS ASSN.—Spring meeting, Apr. 10-14, Palm Beach, Fla. Association headquarters are at 342 Madison Ave., New York.

WIRE REINFORCEMENT INSTITUTE, INC.—Spring meeting, Apr. 11, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at National Press Bldg., Washington, D. C.

CONCRETE REINFORCING STEEL INSTITUTE—Annual meeting, Apr. 11-16, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 38 S. Dearborn St., Chicago.

Believe it or not!

a Machine Tool Weldment

Bases like this, Fabricated by Acme

excel in Strength, Rigidity, and Precision

Finish . . . save Weight and Cut Costs.

No Design is too complicated

. . . not even Yours!

In Doubt? Ask for Bulletin B-3
"The Facts about Weldments and Castings"

ACME WELDING

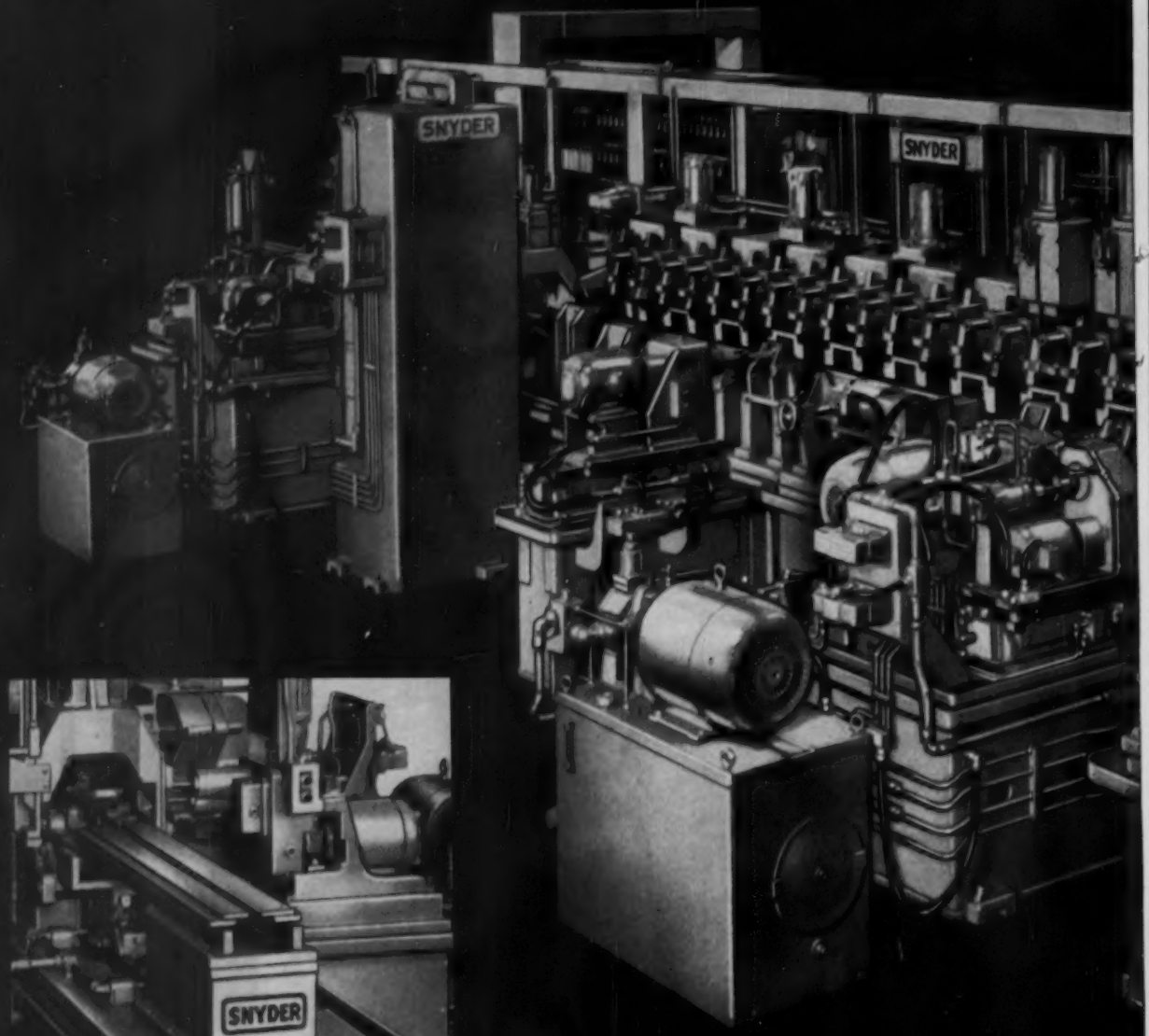
DIVISION OF THE UNITED TOOL & DIE CO.

1044 NEW BRITAIN AVE., W. HARTFORD, CONN.

STEEL
STAINLESS STEEL
EVERDUR
ALLOYS

A.S.M.E. U68-U69 Qualified Welders • A.P.I.-A.S.M.E. Approved
Underwriters Label and Inspection Service • Navy Approved
National Board Approved • Hartford Steam Boiler Inspection Service

National Representative
TRANSMISSION EQUIPMENT CO., Inc. • 441 LEXINGTON AVE., NEW YORK 17, N. Y.



This is the discharge end of the machine. The part, which is originally in vertical position, is laid horizontally and swung 90° to expose all sides to the tools.

SNYDER SPECIAL automatic

24-station transfer machine for processing automotive water pump housings; drills, mills, faces, chamfers, taps all holes and probes tap drill holes. Production, 81 pieces an hour at 80% efficiency.

SNYDER

TOOL & ENGINEERING COMPANY

3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

30 Years of Successful Cooperation with Leading American Industries

don't let inventories pile up

– call **CRUCIBLE**

Don't load up on special steel inventories . . . for your nearby Crucible warehouse carries full stocks of tool, high speed, stainless, alloy and other special steels. Keep your own stocks low; order the steels you need – *when you need them* – from Crucible.

Let us share your inventory load. Whenever you need special steels – *call Crucible.*

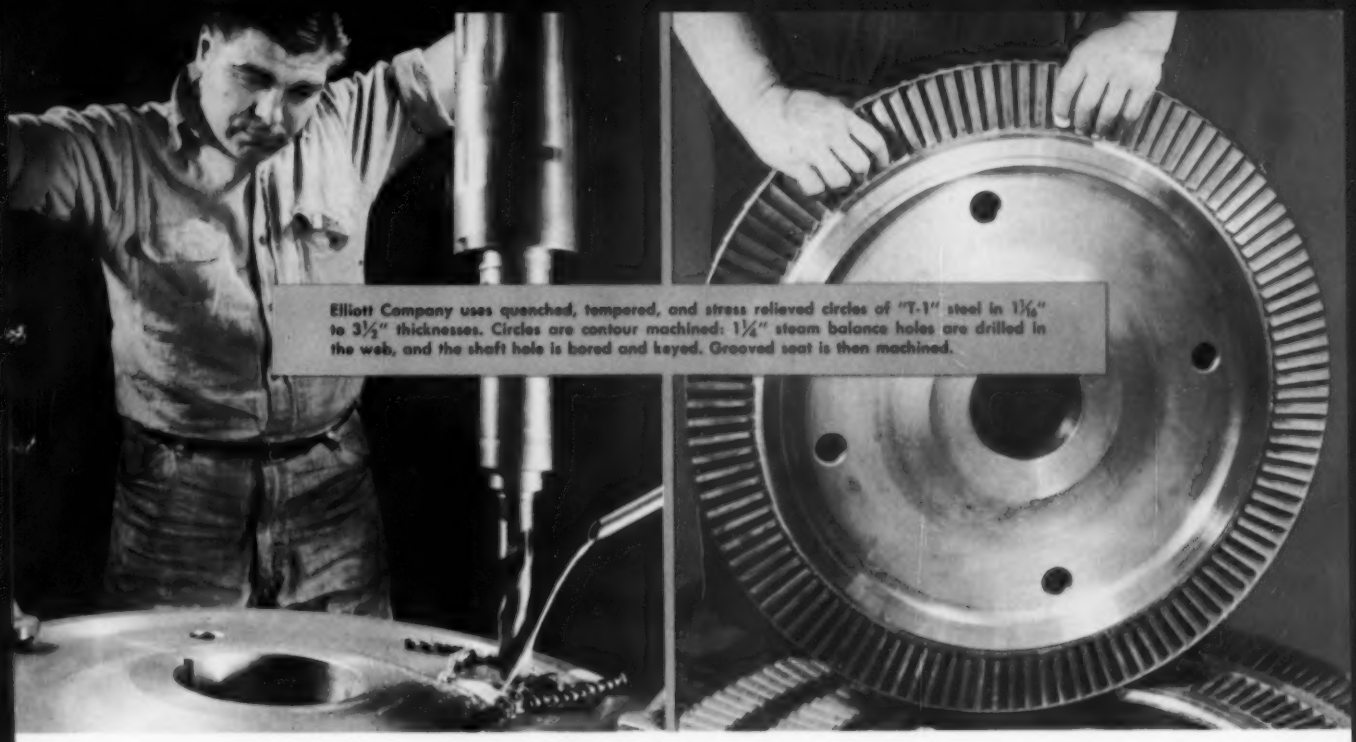
Stocks maintained of:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el . . . AISI Alloy, Onyx Spring, Hollow Drill Steel and other Special Purpose Steels

CRUCIBLE first name in special purpose steels

WAREHOUSE SERVICE

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DAYTON DENVER • DETROIT • HOUSTON • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH PROVIDENCE • ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • ST. PAUL • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.



Elliott Company uses quenched, tempered, and stress relieved circles of "T-1" steel in 1 5/16" to 3½" thicknesses. Circles are contour machined: 1¼" steam balance holes are drilled in the web, and the shaft hole is bored and keyed. Grooved seat is then machined.

New USS "T" Steel cuts material cost 60%

in rotor discs of small turbines

Provides high strength at high temperature, and stability at high speed of rotation

• The Elliott Company, Jeannette, Pennsylvania, makes industrial steam turbines for driving pumps, fans, blowers, and other rotating equipment. The steel for the turbine discs must withstand high stresses at high temperatures and at speeds as high as 6,000 rpm. It must be sound throughout. That's why Elliott Company has switched to new USS "T-1" Steel in these discs.

"T-1" provides a minimum yield strength of 90,000 psi. and good creep rupture strength to 900°F. It poses no severe fabrication problems. What's more, "T-1" costs 60% less in this turbine application than the alloy steel previously used. And the switch to "T-1" required no change in design.

Although USS "T-1" Steel is comparatively new, it already has proved well suited to a great variety of applications. In addition to great high-temperature strength, it has extraordinary toughness at temperatures far below zero. It has excellent resistance to impact abuse, impact abrasion, and atmospheric corrosion. By taking advantage of these superior properties, you can reduce the size and weight, increase the strength and durability, and reduce the cost of such varied equipment as pressure vessels, power shovels, draft lines, storage tanks, conveyors, bridges, and towers. Where field fabrication or repairs are necessary or desirable, "T-1" cuts costs still further because it can be welded or flame cut either in shop or field without pre-heating or stress relieving.

Send the coupon for complete information.

United States Steel, Room 4836
525 William Penn Place
Pittsburgh 30, Pa.

☐ Please send me your booklet, "United States Steel presents T-1" which contains the full story of "T-1" steel.

☐ Have your representative get in touch with me.

Name.....

Address.....

City.....State.....

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T" CONSTRUCTIONAL ALLOY STEEL

USS

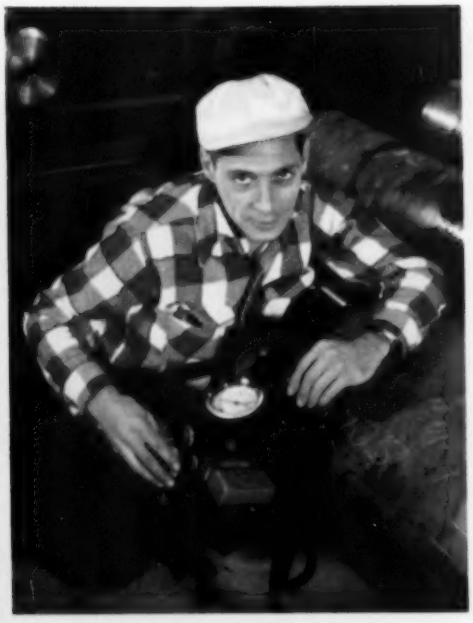
SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

S-271

UNITED STATES STEEL

"We never take a chance

on a hardness check"



—says Kenneth Strang,

U. S. STEEL INSPECTOR

As a U.S. Steel Inspector for 18 years, Kenneth Strang realizes the importance of an accurate hardness check.

Part of this is due to the fact that our own plants use such a great number of hardened steel work rolls. Our numerous cold reduction mills act as a testing ground for every production process and inspection! When you buy a forged steel roll from United States Steel, you get the same unparalleled quality that goes into our own mills.

Before final grinding and shipment, each roll is checked from one end to the other to determine the exact hardness pattern, and to make sure it conforms to the customer's specifications.

Of course, hardness checking is only one of many inspections that are made to insure the usual Homestead Quality Forging. Rolls are a premium product with us, and they are treated as such in every step from the electric furnace ingot to the finished product. The steel, the men who process it, and the equipment they use are carefully coordinated to give you the best forged roll that you can buy.

We solicit your inquiries. For a free 32-page booklet that describes USS Quality Forgings, write to United States Steel, Room 4631, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS Quality FORGINGS

- heavy machinery parts—carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- hammer bases and columns

Heroult
ELECTRIC MELTING FURNACES

TOPS FOR PRODUCTION OF HIGH GRADE STAINLESS, ALLOY AND RIMMING STEELS

World's Largest Electric Furnaces

. . . now in operation!

INSTALLED in the ultra-modern mill of McLouth Steel Corporation, in Detroit, these giant *200-Ton* Heroults are the largest electric melting furnaces ever built. With an inside shell diameter of 24'6", they have a rated charge capacity of 400,000 pounds, and each is designed for efficient operation on 25,000 to 33,000 KVA transformer capacity. Featuring a swing-type roof, these furnaces are equipped with the finest, most up-to-date mechanism and electrical controls available.

McLouth's adoption of electric furnaces of this size sets a precedent. It is a "first" which should conclusively prove that, in addition to closer control, higher uniformity, better performance, and greater safety, large capacity Heroult Electric Furnaces are an economically sound investment—even for high tonnage steel-making.

We welcome an opportunity to help you select and install the furnace best suited to your particular requirements.

ASK FOR NEW CATALOGUE. *Contains latest information on modern electric furnaces—types, sizes, capacities, rating, etc. Write Pittsburgh Office for free copy.*

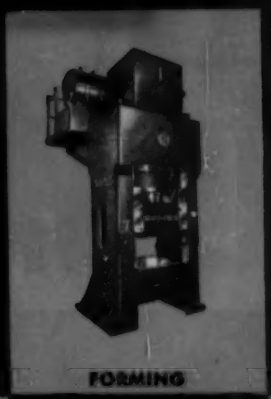
AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in New York, Philadelphia, Chicago, San Francisco and other principal cities.
United States Steel Export Company, New York

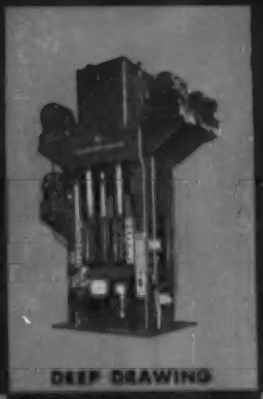
USS

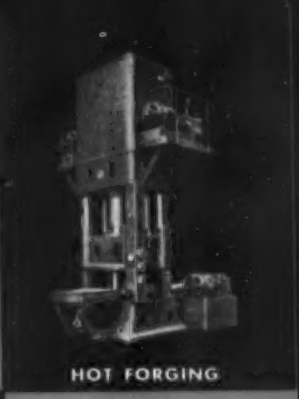
UNITED STATES STEEL

COLD EXTRUSION


FORMING

HORNING

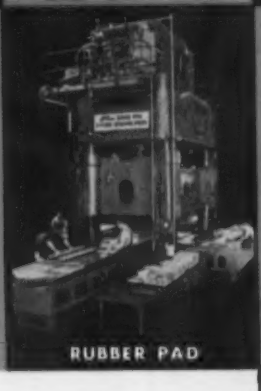

DEEP DRAWING

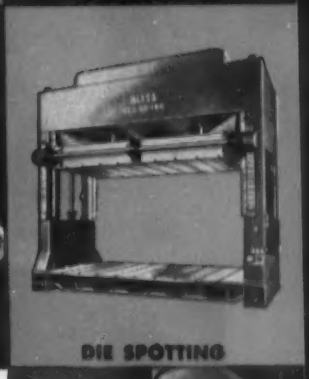

HOT FORGING

STRAIGHTENING

COINING

POWDERED METAL


RUBBER PAD


DIE SPOTTING

REDRAWING

COLD FORGING

HOBBING

FORGING

There's a BLISS Hydraulic Press for practically every operation

and this 36-page catalog describes the entire line

The Bliss line of Hydro-Dynamic presses is one of the most complete available. Whether you are working with sheet, plate or powder—requiring single, double or triple actions, housing or open-rod frames, slides that move up or move down—Bliss has a hydraulic press for almost every operation.

See this complete line for yourself. It is thoroughly described and illustrated in our new 36-page brochure. Write today for your copy of Bulletin 30-A.

BLISS SINCE 1857

on your press is more than a name...it's a *guarantee*

E. W. BLISS COMPANY, Canton, Ohio

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Subsidiary: The Die Supply Company, Cleveland, O. • E. W. Bliss (England) Ltd., Derby • E. W. Bliss Company (Paris) France

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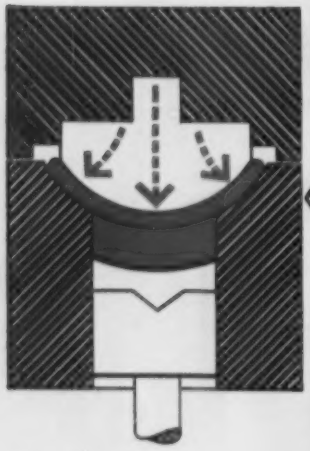
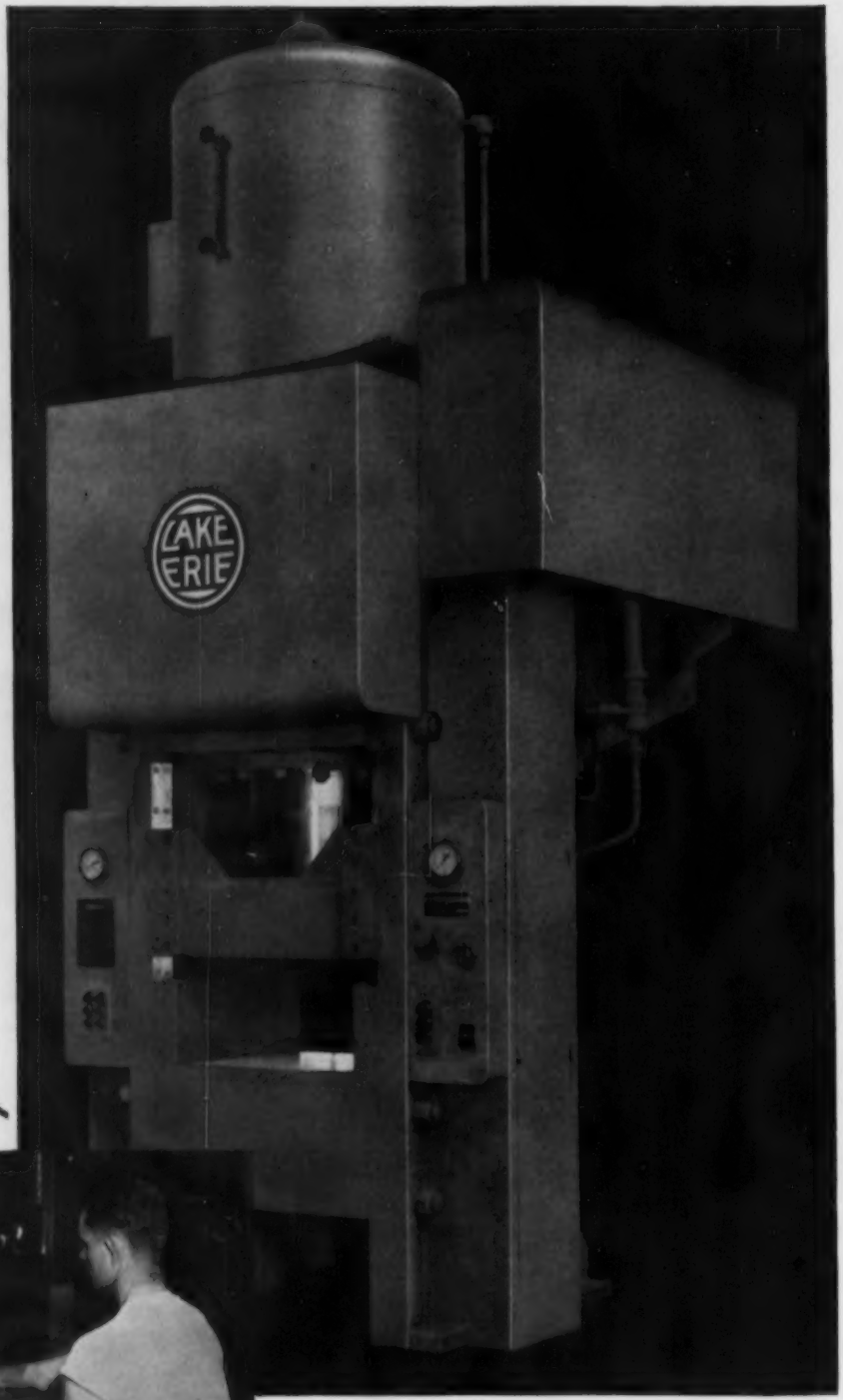
COLD-FORMING

ANOTHER example of the BIG TREND in metalworking



"MOVE the metal ...it's cheaper than REMOVING it!"



• Pole shoes being swaged on a 600 ton high-speed Lake Erie Hydraulic Press. Production of these pieces averages 2,000 per hour.

PAYS OFF 4 WAYS!

A major producer of automotive parts and electrical systems reports:

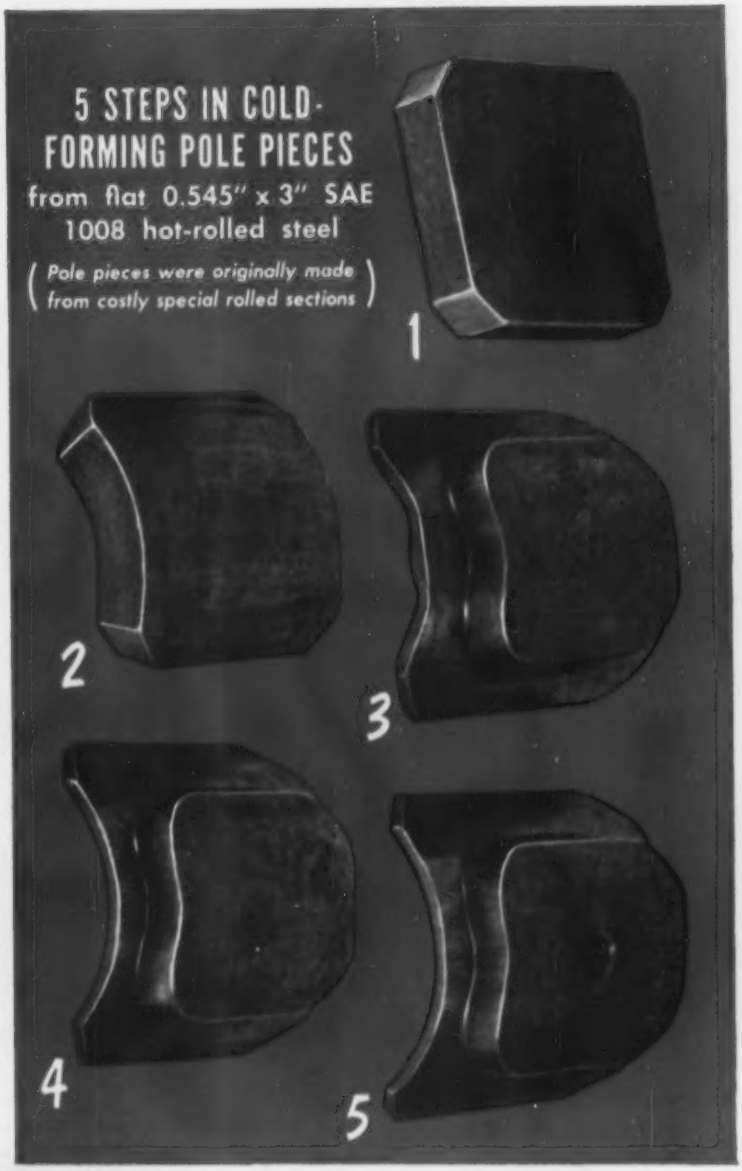
1. MATERIAL SAVINGS
of 50% or more common in production of automotive parts.

2. LOWER TOOLING COSTS
because special-purpose machines are eliminated.

3. DELAYS AVOIDED
in starting production.

4. HIGH PRODUCTION RATES
are realized with cold-forming processes (sizing, swaging, coining and extruding).

The big trend in metalworking today is to press metal into a desired shape rather than to shape it by machining. This results in new and better products at lower cost. These new processes include cold "pressure" forging of aluminum, cold extrusion of steel, and high pressure closed die extruding of aluminum, brass and other non-ferrous alloys. Also falling within this category are somewhat older though greatly changed and improved methods for the extrusion of aluminum, hot forging of ferrous metals, powder metallurgy, deep drawing of sheet and die casting. These new and improved production techniques are already saving millions of dollars in materials and production time. Lake Erie engineers are in the forefront of these developments. They will be glad to explore applications in your production. No obligation. Call us.



LAKE ERIE
HYDRAULIC PRESSES

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HYDRAULIC PRESSES • DIE CASTING MACHINES
ROLLING MILL AUXILIARY EQUIPMENT
LAKE ERIE®

Reversing Ram Makes Die Changes Easy

This ruggedly built press is an operator's delight. It is provided with a reversing ram drive which permits backing the ram or upper die away from the work at any point in the stroke.

Since parts are produced in small quantities on this press, the dies and machine settings usually must be changed many times during a day. The reversing ram and other fine features make this work easy and fast for the operators.

This press is rated at ½" x 14'-0" mild steel but will bend plate to 18'-6" long that can clear the 18" deep throat.

No Other Shear Has So Many Important Features

Operators in hundreds of plants all over the country have acclaimed the ease of operation of Steelweld Shears. They like them because they have features that ease their work and make for accuracy. Steelweld is the only pivoted-blade shear on the market. No other shear has the wonderful MICRO-SET knife adjustment. Every Steelweld Shear is provided with fatigue-reducing electric foot switch control as standard equipment.

This shear is rated at 10' x 1".

Inquiries Invited for:

- Shears
- Bending Presses
- Single-Point Presses (Single and double action types)
- Two-Point Presses (Single and double action types)
- Four-Point Presses (Single and double action types)
- Air Cushions

Operators LIKE STEELWELD MACHINES

THE MAN who operates a machine day in and day out usually gets to know it pretty well. If he has worked on various make machines, he is in a position to compare. He knows the good as well as the weak points. He can tell you what machines make his job easiest, what produce the most, what require the least maintenance. We have great respect for the operators and listen to what they say.

What we have been hearing about Steelwelds has elated us greatly. Briefly it is this: The operators have high regard for Steelwelds. They like their ease of operation which leaves them fresher at the end of the day. They approve the various adjustments with which Steelwelds are equipped and the simplicity of making them. They applaud the fact that the machines will operate continuously for long periods without need of attention.

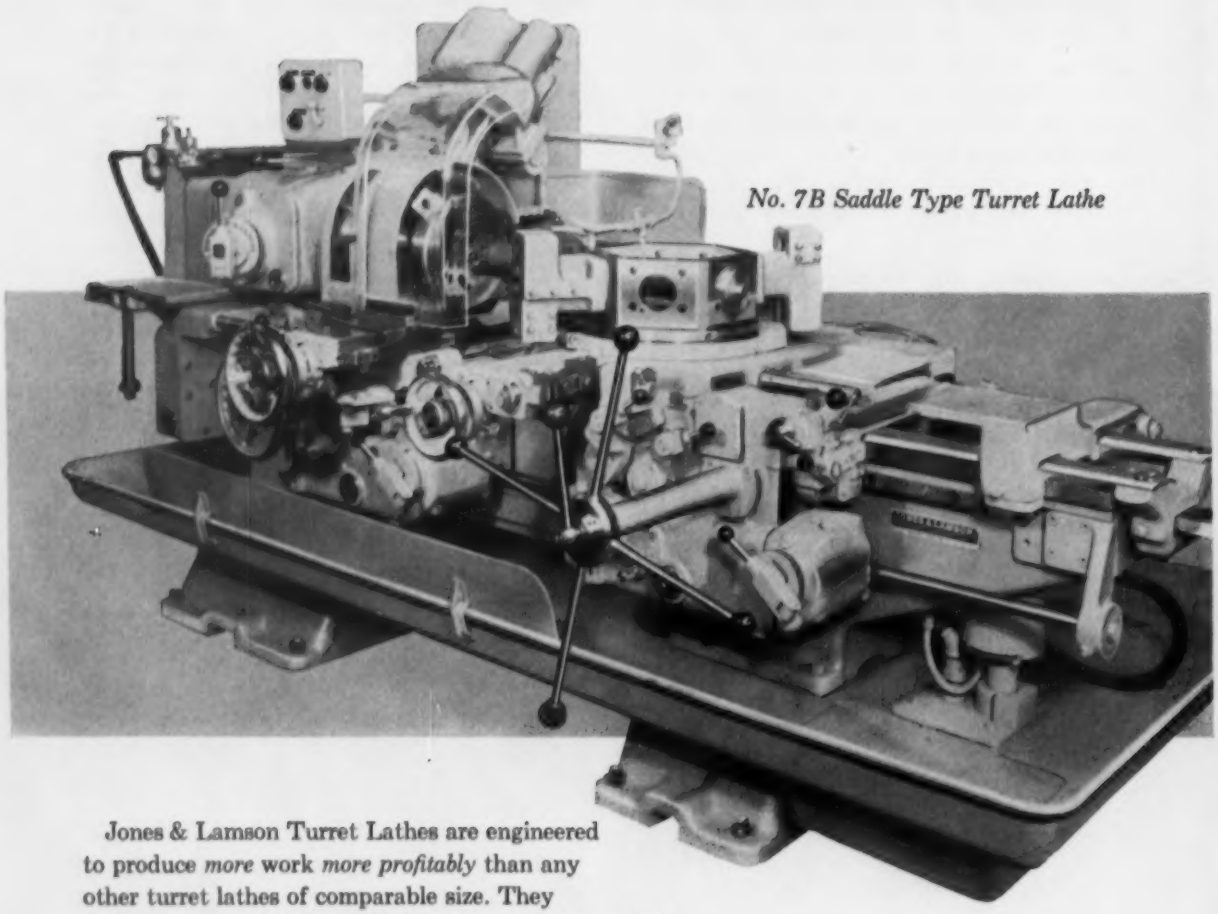
The combination of the above factors, namely: Ease of operation, high production, excellent performance, and low maintenance, is hard to beat and accounts for the ever increasing popularity of Steelweld Presses and Shears.

GET THESE BOOKS!
Catalogs No. 1010 (Presses) and No. 1011 (Shears) give construction and engineering details. Profusely illustrated. Sent free.

THE CLEVELAND CRANE & ENGINEERING CO.
4858 EAST 281st STREET WICKLIFFE, OHIO.

STEELWELD
PRESSES and SHEARS

Engineered for Precision... Powered for Production...



No. 7B Saddle Type Turret Lathe

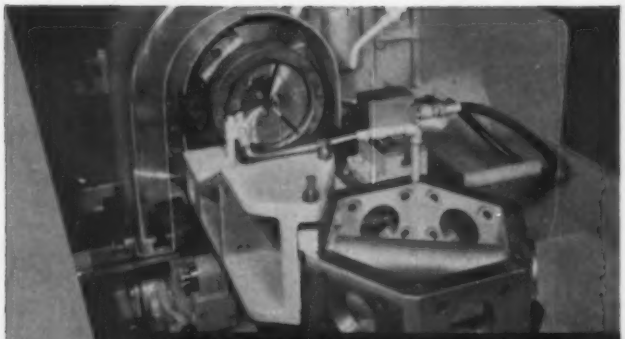
Jones & Lamson Turret Lathes are engineered to produce *more* work *more profitably* than any other turret lathes of comparable size. They have the rugged, rigid construction that makes possible greater accuracy and the use of Hi-Velocity turning; and they incorporate many superior features that assure PRODUCTIVE CAPACITY unmatched in its class. Adequate spindle speeds and horsepower insure the proper use of carbide cutting tools at surface speeds of 650-750 feet per minute.

J&L JONES & LAMSON MACHINE COMPANY

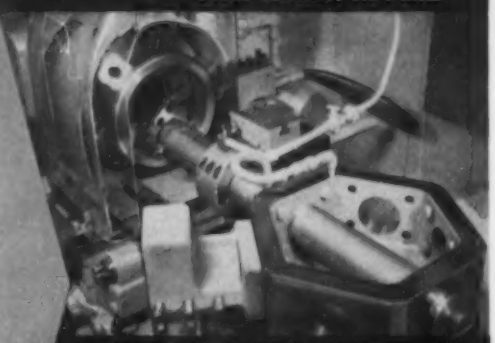
Jones & Lamson offers you a choice of methods for acquiring modern, profit-producing J & L equipment. In addition to outright purchase, J & L makes available several different "Pay-From-Productivity" plans at interest rates of 3¼% and lower (add-on), and a broad variety of lease plans.

Send today for complete details on J & L's machines, methods and Procurement Plans. Simply fill in the coupon, clip it to your letterhead and mail.

and capable of doing jobs like this...

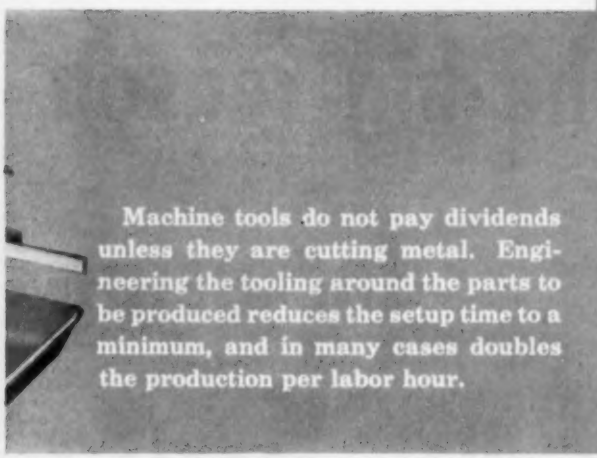


First Operation: One tool mounted on the Hex Turret turns the O.D. while a tool mounted on the rear of the cross slide faces one end. At the end of the facing cut, the radius on the O.D. is formed. Floor-to-floor, 1.94 min.



Second Operation: Location is taken from the two previous finished surfaces. Boring and I.D. chamfering are performed by using tools mounted on the Hex Turret while facing and forming of the O.D. are finished by tools mounted on the rear of the cross slide. Floor-to-floor, 2.57 min.

Third Operation: Special wrap-around jaws mounted on a power operated three-jaw scroll chuck are used for holding the finish turned ring when grooving. The groove is formed by a radius tool held in a bar mounted on the Hex Turret (this applies to internal or external straight or taper races). I.D. is also chamfered in this operation. Floor-to-floor, 1.67 min.



Machine tools do not pay dividends unless they are cutting metal. Engineering the tooling around the parts to be produced reduces the setup time to a minimum, and in many cases doubles the production per labor hour.

In this case high production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Saddle Type Turret Lathes. Inner and Outer Ball Bearing Races and Roller Bearing Races are produced on the same machines. Setup time from one lot to the next does not exceed fifteen to twenty minutes per machine.

MACHINE TOOL DIVISION

UNIVERSAL TURRET LATHES • FAY AUTOMATIC LATHES • AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES • AUTOMATIC THREAD & FORM GRINDERS • OPTICAL COMPARATORS AUTOMATIC OPENING THREADING DIES & CHASERS

511 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

Jones & Lamson Machine Company
511 Clinton St., Dept. 710, Springfield, Vt., U. S. A.

Please send me the J & L Machine Tool Replacement Information Kit.

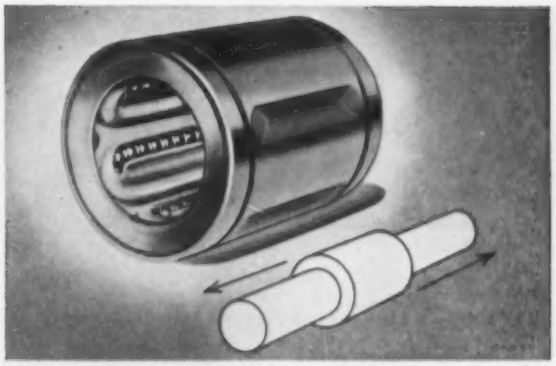
Name _____

Title _____

Have you overlooked the big reason for using alloy steels?

When horsepower was increased on the Harley-Davidson motorcycle from 30 to 55, company engineers were faced with designing a transmission that could take the tremendous impact and stress. Republic metallurgists suggested Republic's 8617 Alloy Steel. The result was: reduction of section; good heat treating and carburizing properties; *more horsepower from the same size transmission.*

PAINT REALLY ADHERES to Republic Electro Paintlok sheets. And rust is shut out. That's why these National Biscuit Company truck bodies are made of this zinc-plated steel sheet that's chemically treated to take paints, lacquers, synthetic enamels — and hold them for years. Tight zinc coating guards against underfilm corrosion and creeping rust. Manufacturers of everything from truck bodies to caskets have found production costs go down when they use these special sheets that hold paint longer and make products look better.



ELECTRUNITE CARBON STEEL MECHANICAL TUBING makes some products possible (like this ball bushing for linear motion by Thomson Industries). Problem here was close-tolerance tubing to house bearings and raceway, plus tough wear by bearings at contact points. Republic ELECTRUNITE Tubing supplied all these advantages along with good surface conditions; good dimensional control, both I.D. and O.D.; uniform wall thickness; uniform concentricity; uniformity to withstand heat treating.

A lot of people are under the impression that alloy steels are used only to get certain necessary properties. Heat-treating qualities, for example. Extra fatigue strength. High impact value. High shear resistance. Or many other reasons.

But analysis will show that alloy steels also save money.

There is no better reason for using them. In fact, we don't recommend them unless they do save money, somewhere along the line.

It's just a matter of how much money you want to save. And you save the maximum when you design parts and process properly for alloy steels. That's where we come into the picture. Our 3-D metallurgical service will help you get the properties you want in your products if your engineers and our metallurgists put their heads together.

Let's talk things over now before the competition steps out ahead. A call to your nearest Republic district sales office will get things under way. Have your secretary do it, soon.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

FREEDOM FROM RUST and corrosion makes any product made of Enduro Stainless Steel a good buy. Good example is laundry equipment. Made of stainless steel, it resists rust, corrosion and the action of most washing compounds and detergents. It's easy to keep clean and attractive. And because of resistance to wear, equipment cost can be written off quickly. Republic, pioneer in stainless steel, shows manufacturers how to use it profitably.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
3104 East 45th St., Cleveland 27, Ohio

Please send me literature on these Republic products:

☐ Enduro Stainless Steel ☐ Mechanical Tubing
☐ Alloy Steels ☐ Electro Paintlok

Name_____ Title_____

Company_____

Address_____

City_____ State_____

E-7505

BIGGEST!

This Betts 100 Inch Worm and Rack-driven Slotter is the largest ever built in America.

It is more than 30 feet high and weighs over 140 tons.

The table has a load carrying capacity of 75 tons and the bed measures 9 feet across the ways.

Seventeen motors are required for its operation.

CONSOLIDATED MACHINE TOOLS

This big Betts Slotter has a reversing planer-type variable-voltage motor drive. All machine functions are push button controlled and the circular work table has General Electric ultra-precise electronic indexing.

CONSOLIDATED MACHINE TOOL

Wholly owned subsidiary of Farrel-

CORPORATION, ROCHESTER, N.Y.

Birmingham Company, Incorporated.

an ACCO product

The greatest improvement in chain since the invention of electric welding!

ACCO's Great New Chain... ACCOLOY X-WELD 125

• *At last*—a chain with welds as strong or stronger than the material . . . welds that won't break when links are bent sharply . . . welds made with two projecting lugs that absolutely prevent dangerous kinking of the chain . . . welds that provide 2¼ times the welded area found in normal flash or butt-welded links. **Accoloy X-Weld 125** Chains hang straight as a die. This newest method of chain welding assures that every link is perfectly formed. These are some of the benefits enjoyed by users of this great new chain.

Accoloy X-Weld 125 Chain has almost countless uses: Slings, bundling, elevator, traction, towing, general utility chains . . . It can be furnished in special analyses and heat treatments to provide greatly extended life and use on tough jobs . . . corrosive jobs . . . abrasive jobs . . . hot jobs. If you specify **Accoloy X-Weld 125** for your next chain job, you'll gain a new concept of chain performance, economy and value. Available in ¼", ⅜", ½", ⅝" and ¾" sizes.

Ask our nearest district office for further information on ACCOLOY X-WELD 125 Chain, *or write the American Chain Division, York, Pa., for descriptive bulletin*

Check these features:

- ✓ In hundreds of destruction tests . . . straight pull and bending . . . **Accoloy X-Weld 125** Chain has never broken at the weld
- ✓ Welded area 2¼ times area in usual butt or flash welding
- ✓ Every X-Welded link is perfectly formed . . . chain always hangs straight as a die
- ✓ X-Weld Lugs are designed to positively prevent chain kinking
- ✓ Special analyses and heat treatments available for tougher jobs
- ✓ Maximum strength-size ratio
- ✓ Field tested and proved under severe service conditions
- ✓ Will withstand normal elongation under standard test procedures

The Secret is in the Weld!

This Accoloy X-Weld 125 link was ground and etched to show its big welded area —2¼ times the size of welded area possible with other welding processes. This means more than double the security at the weld —and only X-Weld has it!

ACCO

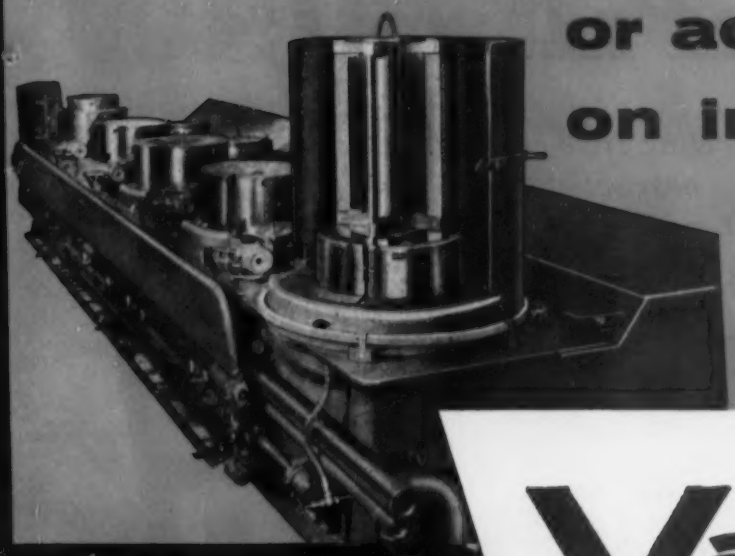
American Chain Division
AMERICAN CHAIN & CABLE

York Pa., Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

for Better Value

NO SLIP

or accumulation on intermediate blocks with



Vaughn®
MOTOBLOX®

Slip is eliminated on Vaughn Motoblox machines because the speed of each block is automatically and precisely controlled to meet the pre-set speed of the finishing block. Wire does not accumulate on the intermediate blocks—operation is truly continuous. ● The Motoblox facts can profit you: let us present them!

THE VAUGHN MACHINERY CO.
Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-ferrous Materials or their Alloys.

®

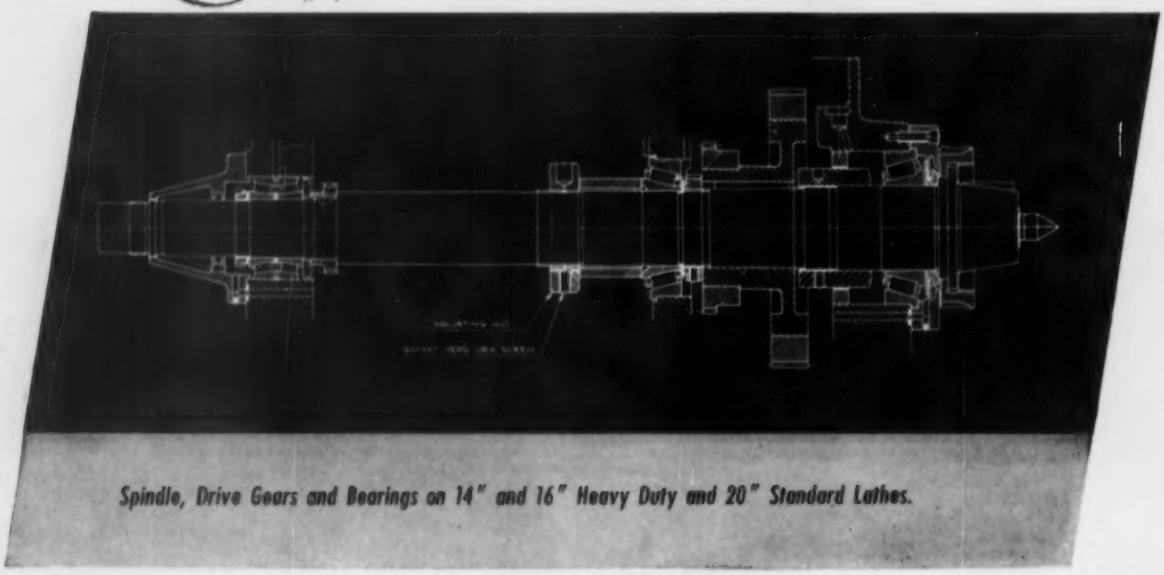
"Quick on the Draw!"

FOR A BETTER DRIVE

...Lodge & Shipley puts it

"ON THE NOSE"

... Locating drive gears and main bearings near spindle nose, drive gears rigidly keyed to spindle for maximum strength — power — accuracy.

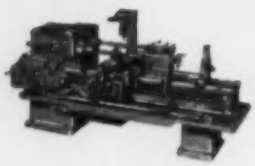


Spindle, Drive Gears and Bearings on 14" and 16" Heavy Duty and 20" Standard Lathes.

Location of driving force and bearings close to the load is a proven advantage in power transmission. Lodge & Shipley drive gears and main bearings are literally "on the nose," grouped at the forward end of the spindle just inside the headstock.

Giving extra ruggedness and power, this detail is an example of the design skill that goes into every part of the Lodge & Shipley Lathe. The result, proved by thousands of users, is a lathe that gives more in production and accuracy—costs less in operation.

For your next lathe, consider a Lodge & Shipley. A representative will welcome the chance to compare a Lodge & Shipley . . . point by point . . . with any other lathe. Request Bulletin No. 200 which describes and explains the many features. The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.



Lodge & Shipley

....your **LODGE**-*ical choice!*

WEIRTON

COLD-ROLLED STRIP STEEL

Also available —

HIGH-CARBON STRIP, N-A-X HIGH-TENSILE STRIP

Sentries of Quality

Weirton mills are blanketed with "sentry stations." From these outposts, the quality and uniformity of Weirton steel is guarded and guided by constant control.

From stations located throughout the mills, samples of materials are periodically carried to the Quality Control Laboratory by special pneumatic tubes. Here, complex analysis, checks and tests are made simultaneously by chemists, metallurgists and engineers, who use the most up-to-date equipment. Based on their findings, directions are flashed by telautograph and two-way radio to the men on the job.

This network of fast-acting controls is one more way Weirton maintains strict high quality and uniformity of its cold-rolled strip steel, along with the many other types of steel it makes. It is one more important reason why you should call Weirton the next time your plans call for cold-rolled strip steel.

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

"wedded" to your present abrasive?

If, for one reason or another, you're committed to a particular brand of abrasive—just turn the page and never mind about CUT STEEL! However, if you're not "wedded", then here's news for you. There's a revolutionary, new type of abrasive that sets a *much higher* standard for the cleaning of castings and forgings. Actually *cut* from high quality alloy steel, it's appropriately named CUT STEEL—and it does an incredibly fine job of cleaning.

In cleaning speed, finished appearance, length of service and low maintenance costs—CUT STEEL will definitely outperform all other abrasives. Yet, Grade "A" CUT STEEL ***sells for less than most cast steel shot*** and Grade "B" ***costs no more than most malleable shot!***

Therefore, if you're "free" to investigate better ways to clean your castings and forgings—be sure to try new CUT STEEL! Samples, prices or trial order, gladly, on request. Write today!

Sooner or later, you too, will change to CUT STEEL!

CUT STEEL

ABRASIVE

ANNEALSHOT and SUPER-ANNEALSHOT

PRODUCTS OF

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

In its original form, CUT STEEL resembles steel grit, with sharp edges and corners.

In usage, it rapidly changes to a spherical shape, in a wide variety of sizes.

Use WELDED STEEL for Greater Strength with Less Weight!

Steel-Weld Fabricated parts and assemblies can save you time and money in many ways . . . they eliminate pattern costs and give you greater strength with less weight. The parts and assemblies shown at the left, and the forty-ton frame and carriage shown above—parts of a loading device for a large extrusion press—are typical examples of thousands of Steel-Weld Fabricated units produced and machined by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. If you need a special mechanical device, or if you require parts or assemblies involving large heavy pieces where time and pattern costs are a consideration, you can call on Mahon with complete confidence . . . personnel and facilities are available within the Mahon plant to handle the entire job from drawing board to finished machining and assembly. You will find in the Mahon organization a unique source . . . a source where design skill and advanced fabricating technique are supplemented by craftsmanship which assures a smoother, finer appearing job embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or have a Mahon engineer call at your convenience.

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON

SHALLOW or DEEP

This H-P-M all purpose press performs drawing, blanking and bulging operations — dies are quickly interchangeable—a bulging operation is shown above.

Here's how an H·P·M cuts costs on Drawing

"No Downtime Since 1945—and We Use Our H-P-M For All Kinds of Drawing Jobs."

Mr. Thos. E. Adams, Jr., Pres. & Treas. Beatrice Steel Tank Mfg. Company Beatrice, Nebraska

Mr. Thos. E. Adams, Jr., President, says, "We've used our H-P-M successfully for drawing aluminum, steel and stainless steel for commercial and military contracts. Work ranges from shallow pan draws to deep drawn stainless steel beer barrels. We're highly pleased with its record of continuous operation since 1945 —without downtime or failures."

Production records like this at the Beatrice Steel Tank Mfg. Co. of Beatrice, Nebraska tell the story. For downright dependability, a minimum of maintenance, maximum production and all-round satisfaction — you can't beat an H-P-M.

It's a typical example of how H-P-M's all hydraulic operation, fast cycle, automatic control and easy die set-up cuts costs for many prominent users. You'll find more and more jobs belong on an H-P-M — that one H-P-M press can often replace older, obsolete equipment with important improvements in quality, production and maintenance. See your H-P-M field engineer at the first opportunity . . . find out how an H-P-M can start making money for you, too.

THE HYDRAULIC PRESS MFG. COMPANY

1006 Marion Road

Mount Gilead, Ohio, U. S. A.

At Ames, Iowa Plant, Green Giant Company

FUEL WASTE REDUCED FROM 11.2% TO 0% WITH CITIES SERVICE HEAT PROVER!

Boilers "Practically Play With Peak Loads"

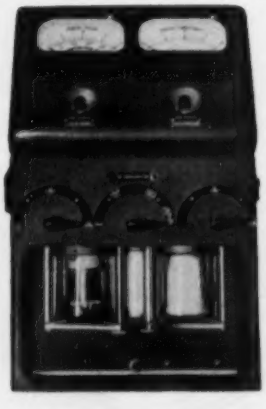
The Ames, Iowa Canning Plant of the Green Giant Company, for several years enthusiastic users of Cities Service industrial oils and greases, recently wrote an equally enthusiastic report of a combustion analysis made with the Cities Service Heat Prover.

Says Plant Official N. V. Blau: "Your Lubrication Engineer brought in the Cities Service Heat Prover and with the assistance of our Service Foreman, ran through a combustion analysis on both gas-fired boilers. The results of these tests indicated insufficient air with a corresponding fuel waste of 10.1% in Boiler #1 and 11.2% in Boiler #2.

"The necessary corrections were made within a few hours while readings were continuing with the Heat Prover. THIS FUEL WASTE WAS REDUCED TO 0%!

"Each year since this correction was made, annual tests of both boilers have been made, and they practically play with peak loads."

Perhaps the portable Heat Prover, supplied and maintained free by Cities Service, can produce similar results in your furnace operation. For information, contact your nearest Cities Service representative or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



THE HEAT PROVER

Not An Instrument That You Buy But A Service We Supply... Free!

- Rapid, continuous sampling
- Simultaneous reading of oxygen and combustibles
- Direct measurement of oxygen and combustibles
- Easy portability
- No maintenance, no re-calibration

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

How can production costs be cut as much as 50% with Enamelstrip Pre-Coated Coil? The Kroder Reubel Company, Brooklyn, N.Y., decided to find out—*and now is finding out!*

The moment Kroder Reubel started fabricating its curtain rods from Enamelstrip, it did away with seven costly operations in the finishing department . . . eliminated the paint lumps that spraying used to leave on their rods . . . lowered insurance rates . . . and put an end to a neighborhood paint fume problem.

An unusual story on production savings, isn't it? But it's still just one example of how hundreds of manufacturers all over the country are improving products and cutting costs with Enamelstrip Coil.

Factory paint shops—with all the expenses of cleaning, tumbling, spraying, dipping, rustproofing, baking and drying—are no longer necessary. Scrap losses are being reduced to a minimum by feeding continuously from a coil of the exact size of Enamelstrip required. Products aren't being returned to manufacturers due to imperfections on the finish.

Fitting Enamelstrip Pre-Coated Coil into your production set-up should be easy, too. Widths from 7/32 to 30 inches in gauges from .006″ to .040″ can be ordered in steel, brass, zinc, aluminum, or any metal that takes a coating. Any color on one or two sides or different colors on each side can be provided to meet individual specifications. Just call, or write.

Products like the ones above—which were made from Enamelstrip—must have a perfect finish. This is another advantage Enamelstrip Pre-Coated Coil offers manufacturers. It can take severe stamping and deep drawing—can even be bent 180°—without paint finish cracking, chipping or flaking.

THE COATED COIL CORPORATION

511 West 30th Street, New York 1 • LOngacre 5-3161

National Sales Representatives for Enamelstrip Corp., Allentown, Pa.

All finishing stands on new Japanese strip mill are TIMKEN® bearing equipped

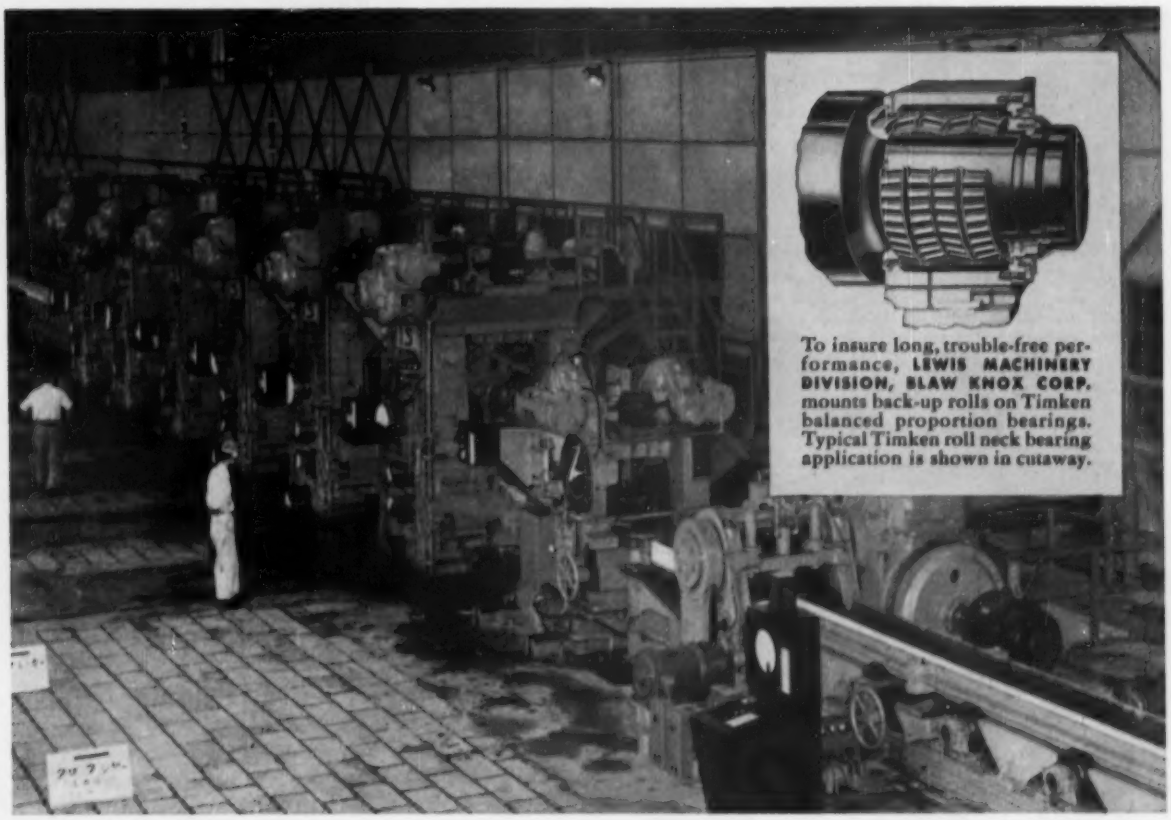
THIS Lewis 4-hi hot finishing strip mill, recently put in operation in Japan, gets maximum tonnage at minimum bearing costs with Timken® tapered roller bearings in all six finishing stands. That's because Timken bearings help keep the mill on the job, day after day, with less time-out for maintenance and repairs.

All back-up rolls are mounted on Timken balanced proportion bearings. They provide greater mill rigidity because they permit larger diameter roll necks than standard roller bearings. Load ratings are increased up to 40%, roll neck strength increased 50 to 60%.

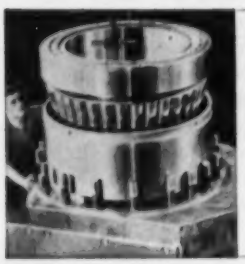
Timken bearings eliminate complicated lubrication systems, permit the use of simple and economical grease lubrication. Rolls can be changed quickly and easily. No special thrust bearings are needed because Timken bearings take radial and thrust loads in any combination. Since Timken bearings practically eliminate friction, higher rolling mill speeds are possible.

Years of research and development by the Timken Company have resulted in many improvements in roll neck bearing design and performance. For full information, consult our roll neck bearing specialists. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



To insure long, trouble-free performance, **LEWIS MACHINERY DIVISION, BLAW KNOX CORP.** mounts back-up rolls on Timken balanced proportion bearings. Typical Timken roll neck bearing application is shown in cutaway.



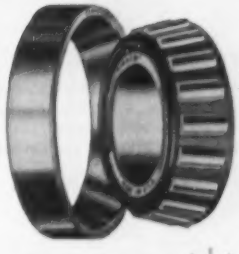
ROLL NECK BEARING ENGINEERING SERVICE

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



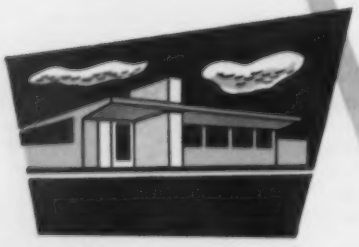
NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST →⬭← LOADS OR ANY COMBINATION

MUELLER BRASS CO.

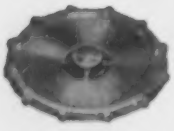
FORGINGS

ARE MADE TO LAST!

QUALITY PARTS AND PRODUCTS FORGED AND MACHINED OF BRASS, BRONZE AND ALUMINUM OR MAGNESIUM



IN THE HOME



IMPELLER DISPOSER

One of four Mueller Brass Co. parts in modern waste disposal unit. Completely dependable in daily operation.

WINDOW HARDWARE

Forged of natural bronze. Can be furnished in aluminum or chrome finish as desired. Retains original beauty indefinitely.

BURNER HEAD

Forged of aluminum for installation in gas stove. Lightweight yet strong.

IN AVIATION

LANDING GEAR TORQUE ARM

SUPPORT MEMBER

INSTRUMENT HOUSING

These aluminum forgings provide the same strength as steel yet weigh only 1/3 as much. Smooth bright surfaces save machining time and eliminate costly finishing.

Specially designed forged housing for sealing diaphragm in aviation pressure warning unit.

IN INDUSTRY

CONNECTING ROD

Forged from "600" series metal. Over two million connecting rods produced without recorded failure.

ACTUATING GEAR

Forged from special Mueller Brass Co. alloy. Must take constant pounding.

AUTOMOTIVE GEAR

Forged of "600" series metal for use in automotive automatic transmission. Replaced part that was giving constant trouble; solved costly problem.

All Mueller Brass Co. forgings, of which just a few are shown here, have a dense, close-grained structure with a high tensile strength. Weight savings up to 40% are possible in the design of parts because of the close tolerances to which they can be produced. Less scrap and longer tool life result from the easy machinability of forged parts. Mueller Brass Co. is completely equipped to design parts for your products, specify alloys (including special alloys developed by our metallurgists), forge, machine, finish and plate the parts and perform all necessary assembly operations. Write today for our free illustrated 32-page forgings catalog and complete information about MBCo forged parts for your products.

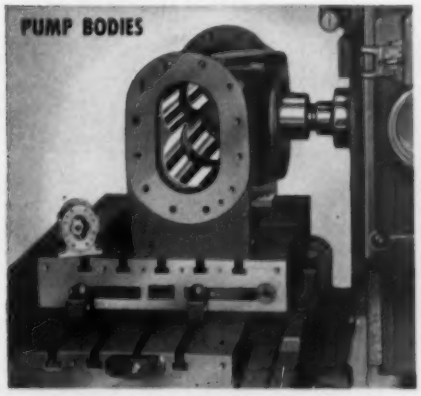
140

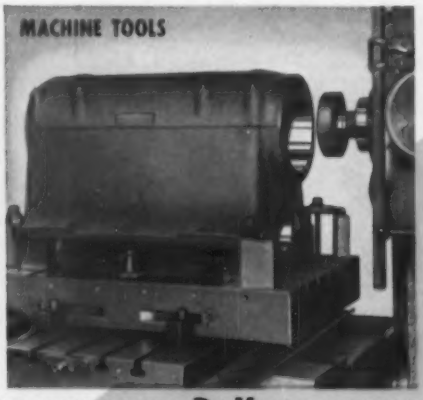
MUELLER BRASS CO. PORT HURON 24, MICHIGAN

The De Vlieg System of

*JIGLESS PRODUCTION

...eliminates expensive boring jigs!





TYPICAL EXAMPLES OF JIGLESS PRODUCTION ON DE VLIEG JIGMILS

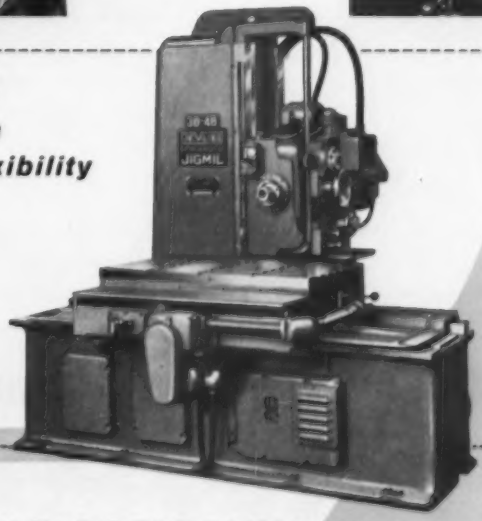
The JIGMIL Technique:

- ELIMINATES SPECIAL BORING JIGS
- REDUCES MACHINING TIMES
- PERMITS USE OF SIMPLIFIED TOOLING
- IMPROVES ACCURACY WITH RESULTANT CUT IN ASSEMBLY COSTS

The De Vlieg System of Jigless Production permits complete flexibility of product design!

If your shop is burdened with costly boring jigs and special tooling, it will pay you to investigate the

DE VLIEG *SPIRAMATIC* JIGMIL



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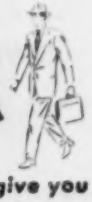

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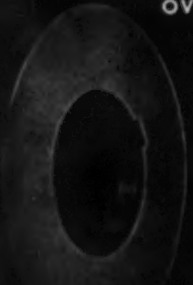

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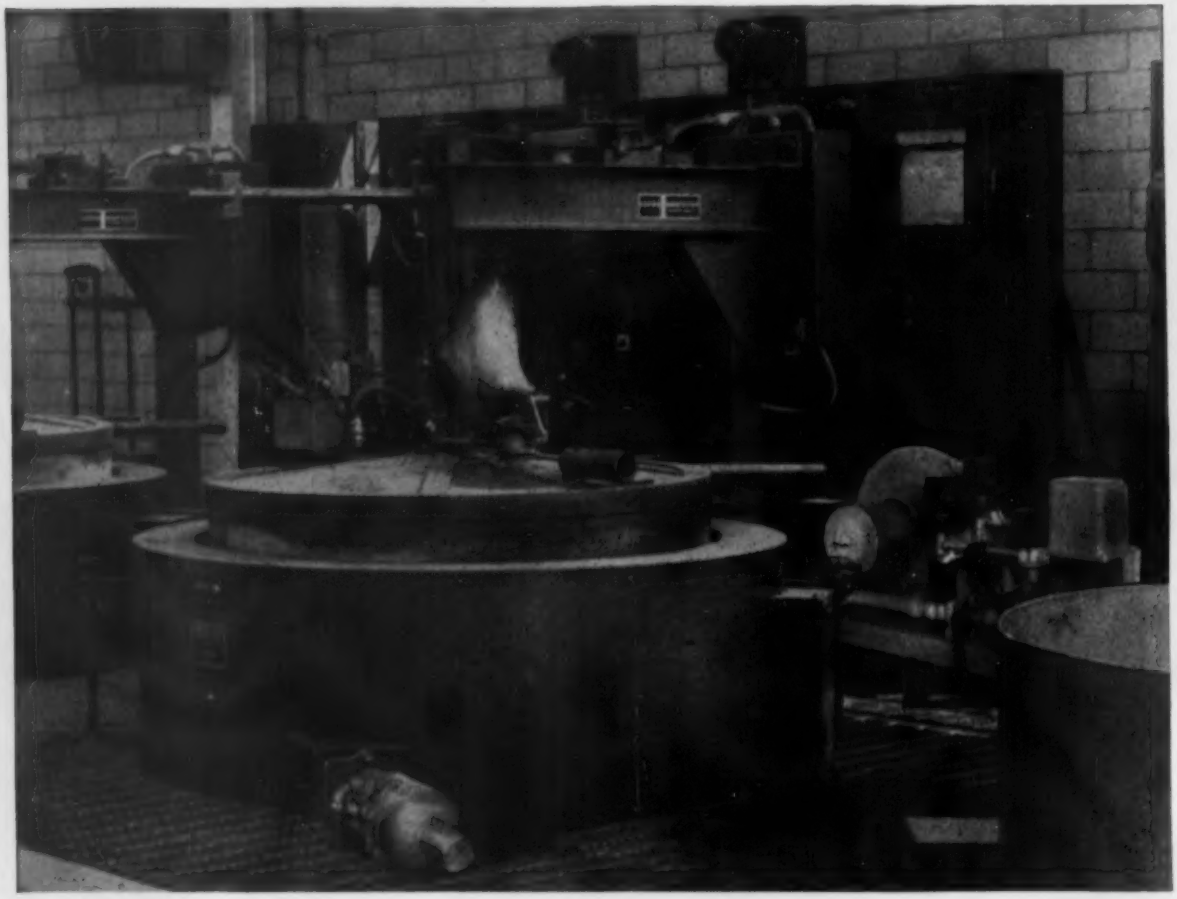

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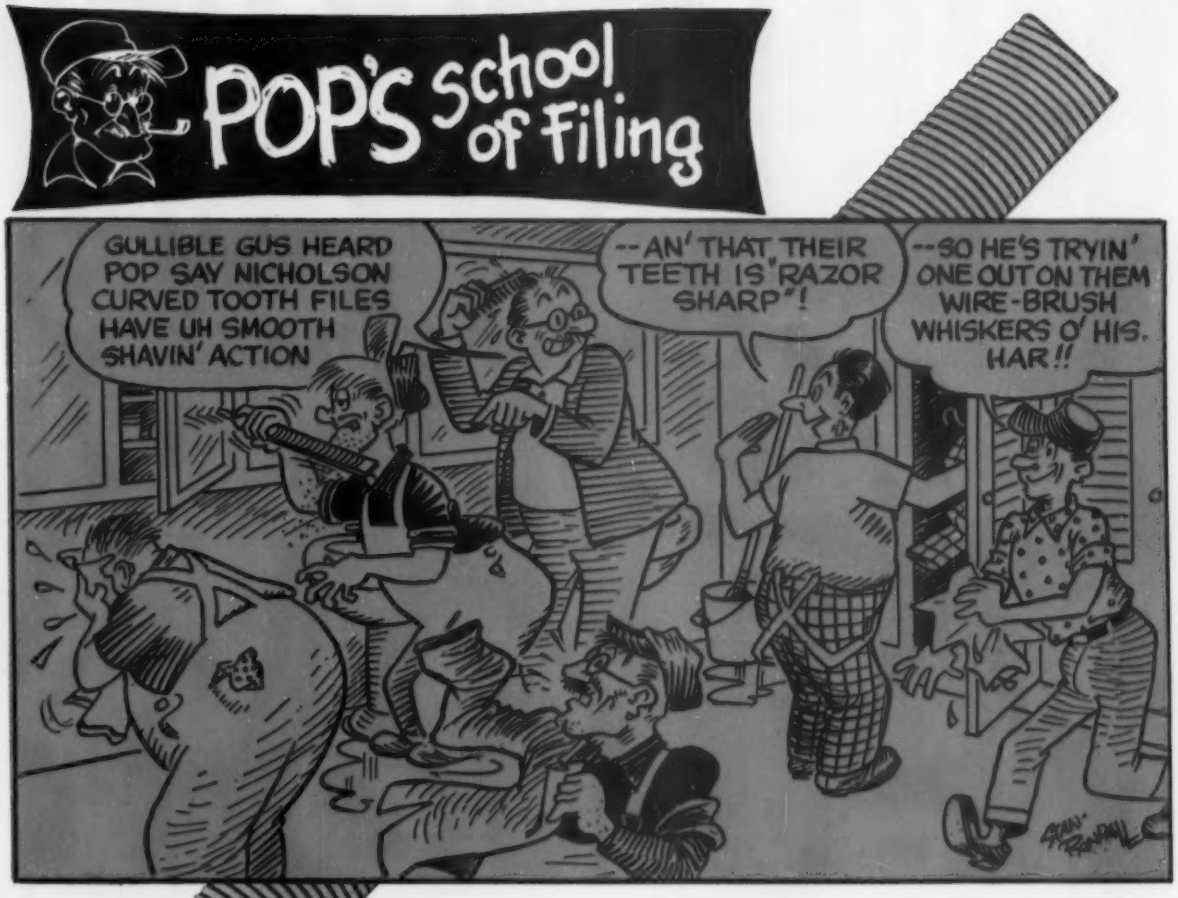
GULLIBLE GUS HEARD POP SAY NICHOLSON CURVED TOOTH FILES HAVE UH SMOOTH SHAVIN' ACTION
--AN' THAT THEIR TEETH IS "RAZOR SHARP"!
--SO HE'S TRYIN' ONE OUT ON THEM WIRE-BRUSH WHISKERS O' HIS. HAR!!

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to solve press obsolescence problems

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For the manufacturer who wishes to own his own presses but minimize his initial capital outlay, Verson offers a Customized Installment Program. It is called "Customized" because the payment plan is tailored to the buyer's own financial requirements rather than to a single fixed plan. Initial payments may be as low as 10 per cent of the purchase price with the balance payable over periods ranging from six months to five years. Further information on a plan to meet your needs will be furnished on request. Please outline your requirements.

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FORECAST

The Iron Age Newsfront

New Orders: Coming In Fast

Idea in some quarters is that steel consumers will stock up on hard-to-get and some not-so-hard-to-get items. This may be the intent, but the way business is going most customers won't get to the inventory building point for some time. Orders are coming in at a much faster clip than even the optimists figured.

Refractory: Soak at 2700°F

A new development in the refractory field is a unique semi-silica fireclay brick of low alkali content—less than 1 pct. Advantages include stability under load and resistance to spalling. It may be used in a soaking heat to 2700°F, 100°F to 150°F above the usefulness of ordinary semi-silica brick.

Engineering: Opportunity for Women

Despite the general percentage rise of women in industry, and it's a group which has made tremendous gains, authorities point to a general shortage of technically trained women. Less than 1 pct of approximately 500,000 engineers are women. An estimated 25 pct of Russian engineers are women, one recent report claims.

West Germans Face Manpower Shortage

Sooner or later West Germany, as rearmament gets underway in earnest, may have to give up some of its export business. Reason: Manpower shortage will result from building up the 500,000 man army. English, French, Belgian and U. S. industrials will watch this development.

Hobs Sharpened Faster Now

Hob sharpening costs are being reduced by a variable speed hydraulic powered high speed hob sharpener equipped with wet grinding attachments. The machines are reported to sharpen hobs up to twice as fast as conventional gear driven equipment.

Cars: Lower and A Shade Longer

It may surprise many to learn that since 1941 the average length of passenger cars has increased just 2.7 in., a 1.4 pct increase in 14 years. This figure may be helpful in estimating steel requirement increases due to changes in passenger car design. Offsetting the small increase in length is a lower silhouette and the constantly increasing use of glass.

Aluminum "Shield" for Hot Jobs

An aluminum coated fabric—a thin metal coating over a light asbestos fabric base—has been developed to give workers on "hot" jobs the protection afforded by heat-reflective aluminum. Garments are reported to be light, stand intense heat, and do not collect metal splatter. A sharp reduction in body burns from radiant heat is reported.

Italian Recovery Poses Scrap Problem

Rapid recent increase in Italian steel output has European steelmakers worried about scrap. ECSC scrap outlook for the first half of 1955 will depend on imports. There's little hope for a substantial increase in supplies within the Community, and a good possibility that maximum prices may be reimposed. Rise in U. S. home consumption is cutting off U. S. sources.

Taconite: Progress Report

Some 7.5 million gross tons of taconite pellets per year will eventually be produced at Erie Mining Co.'s big taconite beneficiation plant in Aurora, Minn. One big crusher will handle 66,000 long tons of the hard ore per 15 hour working day.

Russia Steps Up Metal Removal Rates

A sharp increase in use of carbide cutting tools and in metal removal rates has been reported from Russia. It's part of a continuing trend toward a conversion to high speed machining in the automotive and related industries.

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NEWS SECTION SPECIAL REPORT

What Defense Spending Means To You

National security is scheduled to cost some $40.5 billion in fiscal '56 . . . But Pentagon estimates may be too low . . . Outlook is that the bottom has been reached . . . What German rearmament means—By *Tom Campbell.*

◆ CIVILIAN BUSINESS in the metalworking field is well advanced in a recovery phase. Furthermore seasonal peacetime influences will probably have a greater impact this year than at any time since early 1953.

But the big question among most businessmen concerns the effect which defense spending will have on industry during the fiscal year and during 1956. It must be assumed that the 1956 budget is a massive document which may or may not accurately predict future national security expenditures.

Answers the Questions

One thing is certain: this year's Federal budget is one of the best forecasts and the most realistic job in modern budget history. Some of the questions coming up include: Will the Far Eastern situation mean that defense expenditures will run ahead of estimates during the rest of 1955 fiscal year and in the fiscal year 1956? How will actual defense spending stack up this year compared to the fiscal year 1954 and what will the trend be over the next few years?

The answers to these major questions may be in the lap of the gods but responsible officials in Washington felt a few days ago that they had reasonable answers. These shape up somewhat as follows:

(1) Even if the Reds attack and there is a limited shooting war in Formosa there will be little or no increase in defense expenditures. This opinion is arrived at on the basis that the Air Force and the Navy are in readiness for anything and that under present predictions there is no chance of using large American ground forces.

(2) Keep in mind that the word "spending" means checks or cash payment for a job which may have been ordered anywhere from a year to two years ago. Spending during fiscal 1955 for national security (this includes Defense Dept., atomic energy, stockpiling of strategic and critical materials and foreign military assistance) will amount to $40.6 billion. In the fiscal year of 1956 it will be about $40.5 billion. The probability is that in fiscal 1957 it will be over $40.5 billion because the Army will have used up all unspent money and will need new procurement funds.

Mister Campbell Goes to Washington . . .

Many businessmen have given up trying to make sense out of the defense spending picture. Current sensitive points have brought even more questions into the picture. To get a simple yet guiding interpretation of the defense spending outlook IRON AGE Editor Tom Campbell went to Washington and interviewed top-level Defense Dept. officials. This information, plus some extensive research on the subject, is the basis of this special report. It gives the lowdown on what defense spending means to you.

During the past year there has been an apparent decline in so-called defense spending. This hasn't been a permanent drop but resulted from a "clean-up" period for hard and soft goods procurement. Here is the way that picture looks:

(1) During the fiscal years 1951, 1952 and 1953 hard and soft goods procurement amounted to about $92 billion. When the present Administration came into office an attempt was made to cut back, eliminate unnecessary expenditures and to put the entire defense budget on a more business-like basis.

(2) In cleaning up the military situation only $9 billion worth of hard and soft goods were ordered in fiscal 1954. That low point was felt by many metalworking firms and related industries.

(3) Hard and soft goods pro-

curement during the fiscal year of 1955 will approximate $17 billion (with hard goods amounting to about $13 billion). For fiscal 1956 the same expenditure can be expected. As things looked last week—even if there were to be trouble in the Far East—top level defense people insist that hard and soft goods procurement in the fiscal year 1957 will still be around $17 billion.

There is no denying that the Administration has a much tighter grip on the national budget than those which went before. There is a much more stringent control over money being spent and there is a more realistic approach in asking for new money.

But there is also a tendency on the part of the Defense Dept.—and the Budget and Treasury Departments—to take current figures and estimates as if they were the gospel. They aren't. There is a chance—and probably a 50-50 one—that actual expenditures for national security over the next two or three years will be slightly higher than the figures arrived at by the Pentagon.

The major conclusion obtained from defense officials plus a study of the budget figures is that defense spending has about reached bottom for the remainder of the cold war. The $1.75 billion deducted from the overall Defense Dept. estimate of expenditures cannot be classified as a savings. It represents the amount of money which Defense Dept. officials insist will not be spent due to slippage, carryover or other reasons based on past performance. Since this is the first time such a credit has ever been used (before it became a fact) we will have to wait till the end of the fiscal year 1956 to find out how "good" this figure is.

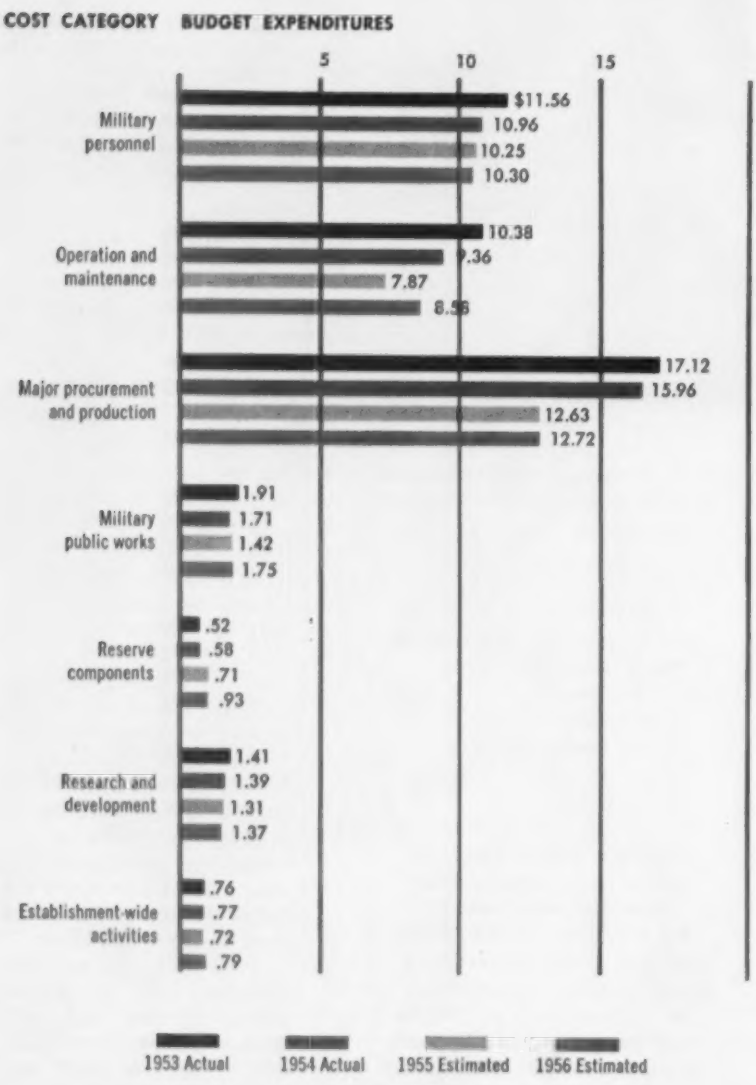
Most industrialists have probably read the highlights on the budget. But they are more interested in what impact the budget will have on industry. Generally this is the way industry will be affected:

(1) There will be more shipbuilding during the next few years. The Navy intends to eliminate obsolescence. There will be an increased number of shipbuilding starts. And there will be a fifth aircraft carrier in the *Forrestal* class. More money will be spent for shore facilities to take care of larger type carriers.

(2) Procurement of aircraft and guided missiles will continue in fiscal 1956 at the same level as in 1955 and will account for two-thirds of total major procurement expenditures. Nike

DEPARTMENT OF DEFENSE COSTS BY MAJOR CATEGORIES

(Fiscal years. In billions)



NOTE: Reserve components include: Army Reserve, National Guard, Air National Guard, Air Force Reserve, etc. Establishment-wide activities include such items as: Office of Public Information, fiscal control, draft (manpower), weapons evaluation, etc.

Breaking through the semantic barrier — definitions of often used and often misunderstood budget terms.

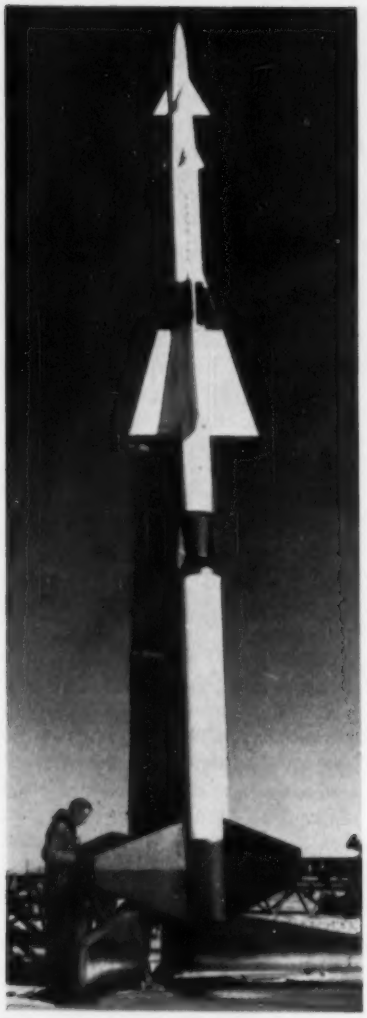
■ HARD GOODS—Materials and goods not immediately expendible. Examples: airplanes, ammunition, ships, vehicles.

■ SOFT GOODS—Materials and goods quickly expendible. Examples: food, clothing, textiles, paper products.

■ DEFENSE SPENDING—Cash paid for materials or projects ordered 1, 2 or even 4 years ago.

■ APPROPRIATIONS—Money voted by Congress to pay for specific defense items. Often carried over from one fiscal year to next. And sometimes reallocated for other uses. Sometimes known as obligations.

■ PROCUREMENT—Placing of orders for hard and soft goods. This starts the ball rolling in industry far ahead of actual "spending," i.e., paying the bill.



HARD TO BELIEVE: Defense Dept. is running into trouble trying to map out Nike installations. Some people object to soldiers and don't want to be "bothered."

installations are being installed and more will be installed during the next year.

(3) Military construction is going up including overseas troop bases and the modernization of bases at home. A substantial portion of military construction will be related to continental defense. Family housing at military installations is due for a face lifting and replacement in many instances.

Considerable rumors have been going around about what effect German rearmament will have upon American industry. Here briefly are the high points in the German rearmament program:

(1) Most of the military hard goods for the German army is in storage or available. But this cannot be taken at 100 pct face value. It may be that the German army will not want precisely what we have set aside. This means that some military items could be classified as "not yet available."

(2) Aircraft have not yet been specifically provided for. Either the Germans will have to make their own aircraft or we, along with other allies, will supply part of them. At any rate, regardless of how they are provided, the aircraft are yet to come although part of our planes may fit the picture.

(3) Soft goods for the German army—uniforms, etc.—are yet to be provided for. This item means that soft goods for eventually 500,000 men must be provided.

It is unlikely that the French will win their argument suggesting that they and others dictate the production of equipment and material for the German army. Some of this rearmament will be carried out by the United States, France and Great Britain, while probably a sizable portion will be produced by the Germans. Real production will not begin before 1956 with the bulk coming in 1957 and 1958. But the psychological effect on American and Western European industry will come long before that.

Certainly the Germans will face a manpower shortage in their civilian industries as the German army, air force and navy are being built up. That would mean that some of the West German export business will be absorbed by other countries — probably England. France and the United States.

Regardless of the situation in France it is expected that there will be rearmament of Germany; if not through the current setup then through joint efforts of U. S. and Britain.

As a factor in their business forecasts, individual industrialists who are definitely involved in national security orders can expect that the 1955 fiscal year experience will be the average one for some years to come. As obsolescence eats into aircraft, hard goods or any other major parts of the defense picture, the same amount of money or more will be provided for newer weapons, newer techniques and greater research on missiles of all types, including intercontinental varieties.

STEEL: Oil Country Shipments Climb

Tube mills making more despite decline in drilling, good consumer stocks . . . Oil men know they'll be needing more . . . Stocking of in-transit depots a bigger factor . . . Some mills at top rate—By K. W. Bennett.

◆ LIKE the old Indian rope trick, oil country goods shipments have been climbing—without too many visible means of support. The spectacle prompted one purchasing agent for a large drilling firm to comment that "Oil country right now is the craziest market in the steel business."

The buyer had reason to wonder. He was sitting on a comfortably fat inventory of case and tube that would last through February and into March. He knew that well drillings had been falling for the past 4 weeks. The number of rotary rigs in operation had fallen from 2830 one month ago to 2574 last week.

But tube mills were positively rolling more steel, both for their own stocks and for customers. Two had advanced in the last 2 weeks to their best rate since early fall, 20 turns a week. Another, at capacity operations, was depleting an in-plant stock of reserve tubing that had been built up during fourth quarter 1954.

The tube is going two places. Though not the biggest factor, an increasing number of customers are throwing off the buying lethargy of fourth quarter, coming into the market for increased tubing and casing purchases even though the new drilling season isn't officially under way.

Takes 50 Pct More

Representative of this growing interest is the purchasing agent for a middling large oil producer, who reduced his intake in fourth quarter, began releasing "hold" orders as early as December, and has placed new orders ahead into March. His first quarter intake of tubing will advance by 50 pct over fourth quarter. This percentage certainly isn't representative but his thinking is. In fourth quarter he deferred about 50 pct of his oil country orders. In first half he has released these shipments, added another 50 pct of the original fourth quarter booked tonnage, and has what he regards as a "normal" first quarter requirement. Based on a probable drilling increase, he'll have no surplus inventory, probably a little less oil country goods than he will actually need.

Currently a bigger factor in the tube shipment increase is the stocking of in-transit shipment points (See THE IRON AGE, Nov. 18, 1954, p. 98). Shipments to depots along the Mississippi and into the Southwest via water in 500-ton barge lots are expected to continue through February and hold mill rollings of tube and casing at a high level through that month and into March. Oil men feel that the carryover into March will be small, that by the last month in first quarter oil drillers will be pulling oil country material from the loading docks of the in-transit depots as fast as the material comes through the yard from the barge dock.

A 60,000-TON order for 24-in. expanded pipe was recently announced by U. S. Steel Corp. president Clifford F. Hood on a visit to the firm's National Tube Div. at Lorain. Tonnage will be used in natural gas lines. Pictured here at visit are: (left to right) Robert Urquhart, works superintendent; John J. Jaworski, Lorain mayor; Mr. Hood; and Harvey B. Jordan, operations vice-president of U. S. Steel.

Mill Rate Rising

Representative of this attitude is the casing buyer for a large drilling firm who believes that the mills are booked solidly for January, with "plenty of open space in February and March." He's not worried. He has "hold tonnage" booked already for March but points out that there's no great need to book 90 days in advance any more, or even 60. The casing can be bought directly out of in-transit stocks if needed on short order, though he'll continue to take the bulk of his shipment direct from the mill. His total first quarter tonnage will advance by 10-15 pct over fourth quarter intake, and that's his minimum figure.

At the mill level, it spells out a

short order book but an advancing —with some points already at capacity operation—rolling rate. At the accessory supplier level, the advance isn't that clear cut. Sales chiefs still speak of "surplus consumer inventories," and "good business late in first quarter." Nonetheless, even here there has been a slight advance in orders.

With the average well depth reaching 4045 ft last year, it's been estimated that deep-well and N-80 casing will soar from 25 to 40 pct of output. At the same time increased use of 4.5-in. is expected, with an increase in output beginning next month. National Tube at McKeesport, Pa., will triple its deep-well casing output with full production not due until late this year or early next.

Oil country goods output is on the rise and a healthy share of it results from increased direct consumer sales.

Grant Tax Aid

Permission for fast tax amortization is secured for 44 new or expanded defense facilities costing $55.1 million during the two weeks ending January 12 from the Office of Defense Mobilization.

The Duquesne Light Co., Shippingport, Pa., was granted permission to write off 75 pct of $14 million to be used for research and development work on a nuclear power plant.

Other certificates issued during the two-week period include Cramet, Inc., Chattanooga, Tenn., 90 pct of $4.9 million for facilities to produce titanium ingots; Inland Steel Co., Indiana Harbor, Ind., 65 pct of $2.4 million for wide flange steel beams; Bethlehem Steel Co., Johnstown, Pa., 50 pct of $1.7 million for steel production facilities; Janney Cylinder Co., Philadelphia, Pa., 65 pct of $74,570 for steel castings; The Colorado Fuel and Iron Corp., Claymont, Del., 50 pct of $688,000 for heavy steel plate.

Latest tax amortization certificates bring to 19,433 the number issued under the program for facilities costing almost $30 billion, of which an average of 60 pct has been granted fast tax benefits.

MATERIALS HANDLING

New Van Streamlines Loading

CLARK "MOBILVAN" is loaded on a flatcar in demonstration of a new method of "piggyback" railroading at Battle Creek, Mich.

One man can load a 10-ton van on a flatcar in the system of "piggyback" railroading recently unveiled by Clark Equipment Co., at Battle Creek, Mich. Principal element of the system, the Clark "Mobilvan" rides on flat-bed trucks to and from the rail siding. Flatcars carry the vans by rail for long hauls. A heavy-duty forklift or straddle carrier transfers vans from the truck to the flatcar.

Minor alterations adapt flatcars and trucks for automatic loading of vans, but the modified carriers can still be used in conventional manner. Loading can be done on a cinder surface. No special ramps or docks are needed.

The "Mobilvan" weighs less than 3000 lb empty; will come with steel or plastic siding; and affords weatherproof protection. Measuring 17 x 8 x 8 ft, the vans ride three to a standard 53-ft flatcar; two to a standard 35-ft flat-bed truck trailer. Van cost is expected to be about $1500.

In a demonstration at Battle Creek, the vans were handled by a big straddle carrier and a forklift truck with a 30,000-lb capacity. Costing about $17,000 and $25,000 respectively, these machines moved two 10-ton capacity vans from a Ford flat-bed truck to a standard flatcar. A third van was set in place to make a full carload.

Loading took a total of 12 minutes as the forklift truck or the straddle truck merely set the vans in place on the car. No tie-down crew was required; the system provides automatic locking devices.

The locking apparatus is mounted in three cross braces which are welded to the frames of standard flatcars. Total cost of installing three mounts on a car is expected to be about $500. Similar mountings for flat-bed trucks will run somewhat less. Locking devices retract when the flatcar or truck is used for conventional operation.

Suggested applications for the new system include transport of liquids (which requires special vans) lcl; shipment of less-than-carload lots from scattered divisions of a company; yard storage of raw materials and components.

Clark has 20 vans in the building stage and will offer equipment for lease or sale during the next 6 months.

WAGE ACT: Still Causes Trouble

Violations found in half the companies investigated . . . Minimum pay, hourly rates and exemptions cause most problems . . . Broad coverage of Act includes most metalworking plants—*By H. M. Duffy.*

◆ INDUSTRY has been having trouble since enactment in 1938 of the Fair Labor Standards Act, better known as the Federal Wage and Hour Law. Basic provisions of the Act are clear enough—75¢ an hour minimum wage; time and a half for hours in excess of 40 a week. But application of some of the fine print still continues to cause headaches. The Wage and Hour people turn up unwitting violations in about half the companies investigated.

Covers Most Plants

Broad areas of coverage are staked out fairly well. All persons engaged in interstate commerce or in the production of goods for commerce come under the Act. This takes in practically all metalworking plants. Even a plant not making direct-out-of-state shipments would probably be covered by the phrase, "for commerce," as a supplier for products that would ultimately cross state lines.

Violations Still Occur

A foundry in Ohio shipping castings to an auto assembly plant in the same state would be one example. The foundry would be covered by the Act because the end product is an item of interstate commerce.

When the 75¢ minimum wage is mentioned, the first reaction of an employer is to smile sadly and think of the days when the figure meant something. Yet violations do occur today. This generally happens when some custom or special situation obscures the actual pay status of an employee.

A man classed as a clerk is working a 35-hour week at an hourly rate. He is part of an office force that is predominantly management. He comes to be regarded as a straight salary man and may work 2 or 3 hours over 35. Technically, this constitutes a minimum wage violation: he is receiving no wages for the time in excess of his agreed 35-hour workweek.

Situations like this can easily arise and a close watch should be kept on any office or unit where employees of different pay classifications are working together.

Exemptions Are Tricky

Requirements for each type of exemption are clearly spelled out in Part 541 of the Fair Labor Standards Act. Difficulty comes when you have a man doing a combination of upper and lower level work.

A furniture manufacturer has a foreman for whom he applied the executive exemption. Exemption was denied because the employee has no authority to hire or fire the men working under him. Also the man spent approximately one-half of his time in routine production work, identical with that of his subordinates. He was a "working" foreman and could not be exempted from overtime compensation as an executive.

This misclassification is commonly made in the case of maintenance foremen. To be exempt, such an employee should spend a minimum of 80% of his working hours in the actual supervision and direction of at least six subordinates.

Must Make Decisions

In the administrative field, an office or non-manual field work employee must have a primary duty directly related to management policies or to general business operation. In addition he must customarily and regularly exercise discretion and independent judgment. He must have a salary of at least $75 a week.

One of the most commonly misused of the administrative classifications occurs in the case of the office manager of a small firm. These men are very often primarily bookkeepers, spending most of their time in work that does not call for independent judgment. Exemption is generally denied on these grounds.

The professional exemption appears to be the easiest to put through. This is probably because

Don't Neglect Pay Records

Incomplete records mean trouble. Make sure you have these basic facts on every employee:

Personal Data
Name in full; home address; birthdate; occupation

Time Data
Beginning of workweek (time and weekday)

Pay Data
Rate of Pay

Time Record
Hours worked each workday; total hours worked each workweek

Pay Record
Total straight-time earnings; total overtime earnings; total additions to and deductions from wages; total wages paid each pay period; date of payment and pay period covered by payment.

Howard M. Duffy, author of this article on the Wage-Hour Law, was formerly an official of the Wage-Hour and Public Contracts Divisions of the U. S. Dept. of Labor.

of the professional standing of college graduates in accounting, law, engineering, and other fields.

To be entitled to a professional exemption, a person must be engaged in truly professional work. He must be applying his special knowledge or talents with discretion and judgment. Purely mechanical or routine work is not professional. Again the minimum salary requirement is $75 a week.

How Much for Overtime?

Overtime problems center around the rate of payment. When a man works more than 40 hours a week, he must be compensated at a rate not less than one and one-half times his regular rate of pay. This does not mean one and one-half times the 75¢ minimum rate.

The regular rate is an hourly rate. For employees not compensated on the hourly rate basis, it is determined by taking the total weekly earnings of an employee, including salary, commission, piece rate or other sources, and dividing by the total number of hours he worked that week. The figure obtained is the regular rate and can easily fluctuate from week to week.

Straight salary arrangements do not eliminate overtime compensation for employees covered by the Act. The hourly rate is computed as indicated above and half-time pay is added for the overtime hours worked. The man's salary constitutes his straight-time pay for all hours worked. Only half-time pay need be added as overtime compensation.

In computing the duration of overtime, remember that each workweek stands alone. If an employee worked 30 hours one week and 50 the next, he must be paid overtime compensation for the 10 overtime hours in the second week even though the average number of hours in the two-week pay period comes to only 40.

Spare the Child

Points to consider in avoiding child labor violations are these: know the ages of young employees; know what they are doing in the plant; and know what they should not be doing. One sure safeguard against age infringements is a state or federal certificate showing that a minor is above the legal age for his job. A draft registration card is a good document for establishing a boy's age.

Most trouble in this category comes from boys under 18 whom employers, knowingly or otherwise, permit to ride in, or operate, motor vehicles and freight elevators.

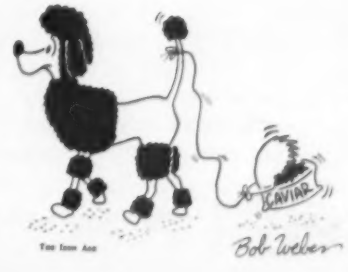
Employment of a child under 14 is "oppressive child labor" in any occupation not specifically exempt. Sixteen is the minimum age for manufacturing, mining and processing occupations, public messenger service, operating or tending power driven machinery other than office machines.

Occupations particularly hazardous for minors and requiring a minimum age of 18 include coal mining, logging, explosive manufacture, operation of motor vehicles, elevators, meat cutting machines, bakery machines, and heavy power tools and occupations involving exposure to radioactive substances.

Bonuses Can Hurt

Bonuses are either discretionary or non-discretionary in nature. A discretionary bonus, which is not classed as regular pay, is one in which the employer exercises full discretion both as to the amount and the actual extending of the payment. In the event that an employer should lose discretion in either or both these respects, then the bonus becomes a part of the regular rate of pay. If an employee works overtime during the period covered by the non-discretionary bonus, overtime compensation must be paid on the bonus.

It is not uncommon for some employees, especially clerks, to come to work before the regular starting hour in the morning or stay an extra 15 or 20 minutes at the close of the workday without having such time recorded and paid for. An employer must make payment for all time an employee is required or permitted to work. It makes no difference whether the boss wants him around or not: if he's working he gets paid.



Chrysler:

Gives 86 pct of employees an 18 pct discount on autos.

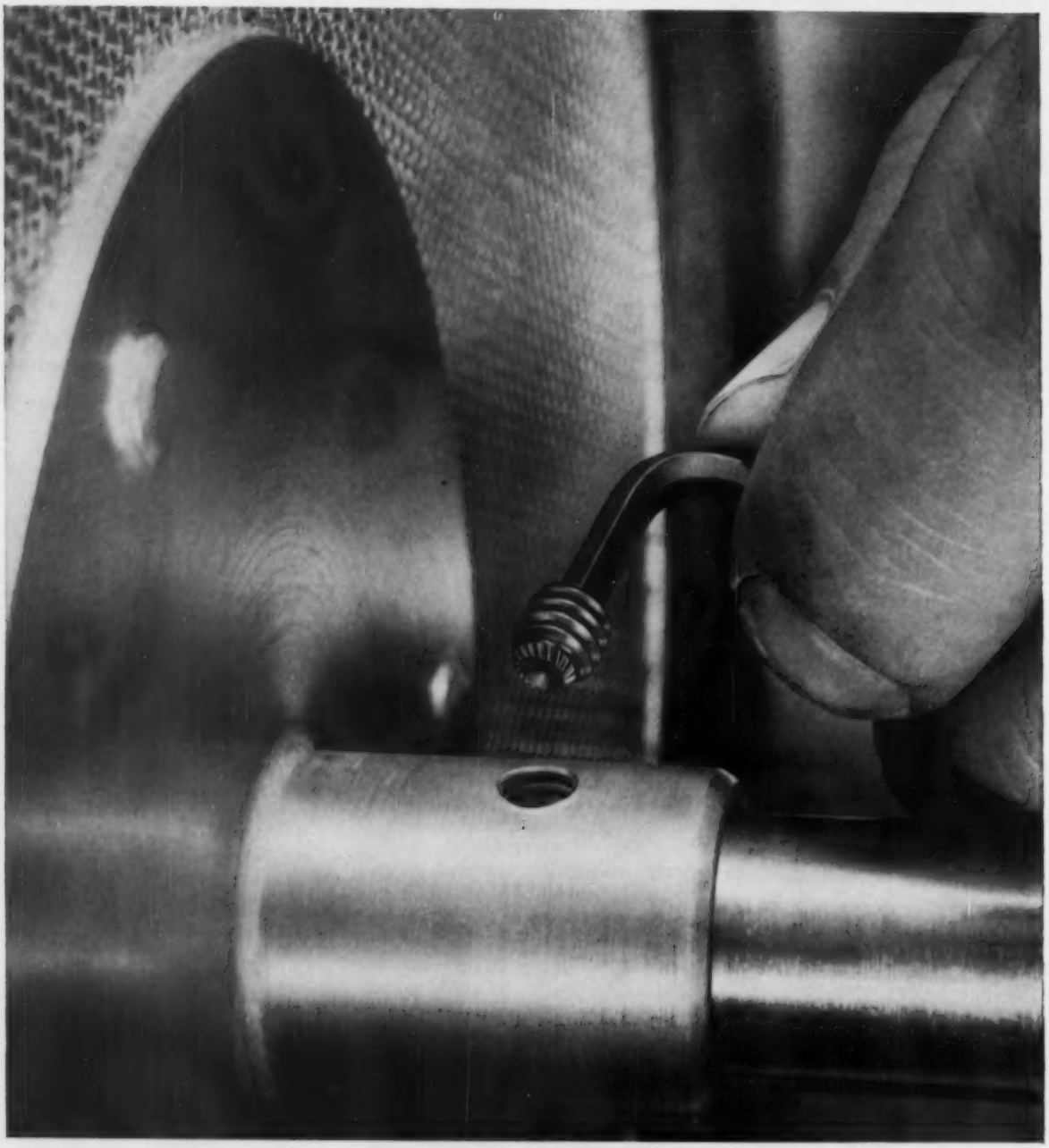
It has been a long time since any automaker tried to pressure employees into buying their own product. In many cases autoworkers have exercised their independence in looking elsewhere for their transportation.

But last week Chrysler tried a new approach, an 18 pct discount on Chrysler-built cars to any employee who has passed the probationary period. It will apply to about 86 pct of the firm's work force or about 145,000 employees. Chrysler's previous discount was only 6000 executives and was a much smaller percentage figure of the firm's work force.

It appeared to be a combination sales and labor relations move and was believed in Detroit to be a good one in both directions. A spokesman was careful to point out that the offer came at a time when factory orders are high, to avoid an implication of lagging sales.

The discount applies to factory retail price, not to transportation costs, delivery and handling charges or taxes. The employee will place his order with the corporation and designate the dealer who will participate. Payment will be made to the company, which will pay the dealer a specified amount for participating in the sale.

Ford and General Motors have discount plans, but only for salaried personnel, ranging from about 15 to 25 pct. American Motors has a discount plan for all employees, but not as high as Chrysler's 18 pct.



HOW TO KEEP A SET SCREW TIGHT. Tighten it as tight as possible. Keep it in place by preventing it from starting to work loose. With UNBRAKO Self-Locking Socket Set Screws you can do both. They are designed for the highest recommended tightening torques in the industry—as much as 45% higher than those used for ordinary socket set screws. UNBRAKOS have the unique knurled cup point which prevents them from starting to work loose, even in poorly tapped holes. For the complete UNBRAKO story, see your industrial distributor—or write STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

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INDUSTRY: Curtiss-Wright Takes Off

Aircraft firm branches into new industrial fields . . . Products include ultrasonic drills, instrumentation, industrial television . . . Bring out new high-temperature plastic—By *D. G. Picinich.*

◆ GROWING TREND toward product diversification in industry got another healthy push last week from Curtiss-Wright Corp., a firm generally known only for its aircraft products. The Wood-Ridge, N. J., company last week announced its entry into 5 new industrial fields.

In ultrasonics, Curtiss-Wright is now offering 10 applications. There are new products in electronics, in radiation instrumentation, a new line of plastics and an industrial television unit.

Show Degreasing Unit

No. 1 attention spot for metalworking executives who visited the company's exhibit in New York last week was an ultrasonic drill which now enters the American market in competition with several other ultrasonic drilling units. The 500-w unit operates at 25,000 cycles per sec, has a slurry tray 5 x 7 x 11 in. and costs in the neighborhood of $8000. Similar units have been in use in Germany for some time.

From industrial television to . . .

An ultrasonic washing unit was also exhibited. The washers are produced with an assortment of trough sizes and with sound power output ranging from 200 to 10,000-w.

They can be used to clean and degrease many metal products such as thin foils, delicate gears, watch movements and ball bearings which are difficult or impossible to clean and degrease by mechanical rubbing or chemical solvents.

A beta gage consisting of an amplifier cabinet with recorder unit, control unit, detector head and radiation source was also a feature of interest to metalworking people. Used for measuring thickness or weight per unit area of any kind of strip or sheet material, the gage can measure steel thickness up to 0.1185 in. and weight per unit area up to 670 oz. per sq. yd. depending on the radiation source.

Heats Non-Metals

A closed circuit industrial television system was another of the Curtiss-Wright exhibit highlights. The system, consisting of a camera, control unit, and receiver, provides means for remote viewing processes in locations and operations where on-the-spot observation is inconvenient, impossible or too dangerous.

Also featured was a dielectric heater which uses radio frequency energy to heat non-metallic materials such as plastics, wood, paper and foods. The heater is designed primarily for research, development and small plant use.

Plastic applications on display included a glass reinforced phenolic plastic for use in the aircraft industry. At temperatures up to 500°F the plastic retains its rigidity and strength, exceeding temperature limits of glass laminated polyester and epoxy plastics.

Boost Small Orders

Air Force buyers reveal an improvement in the percentage of "small business potential" contracts which actually were awarded to small companies in the latest complete fiscal year. By definition, the potential is the total dollar value of item and service awards judged suitable for production or performance by firms with fewer than 500 employees. They received more than 70 pct compared with 55 pct 2 years earlier.

Ultrasonic drills

A AVAILABILITY
S SERVICE
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AVAILABILITY of B&W CARBON STEEL SEAMLESS MECHANICAL TUBING

Gives you buying convenience

B&W AVAILABILITY MEANS:
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1 You can specify hot-finished, cold-drawn or roto-rocked tubing.
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B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA-4049 (CSM)

New Improvement Program Set in Ohio

Armco Steel to boost production capacity . . . Expects to spend $60 million . . . Timken Bearing to produce longer tubing for oil, gas use . . . Thompson Products planning to construct engineering center.

◆ ARMCO STEEL CO. last week announced $60 million has been allocated for an extensive improvement program including an increase in steelmaking capacity. Full details were not available at press time.

With some excess blast furnace capacity from a new unit started recently at Middletown and a handy supply of scrap bundles from nearby appliance plants, some expansion of openhearth capacity is indicated. Armco is one of the major U. S. sheet producers with 1.9 million tons of sheet capacity of a total 3.1 million tons of steelmaking capacity. Of the sheet total 1.6 million tons is in cold-rolled. Bulk is concentrated at Middletown with some additional at Butler, Pa., and galvanizing capacity at Ashland, Ky.

Board chairman Charles R. Hook announced last week that 1954 income hit approximately $41 million. Net earnings in 1953 were $33.9 million. Total sales last year were $531 million compared to $588 million in 1953 and ingot production was 4.4 million net tons, 5 pct below peak 1953.

New Piercing Mill

A $360,000 expansion program to produce longer pierced tubing was announced last week by Timken Roller Bearing Co. at Canton, Ohio. Vice-president John Fick said the firm's Gambrinus piercing mill will be lengthened to pierce tube from 50 to 130 pct longer than at present to meet increased demand for heavy-walled long-length tubing.

Principal demand is from oil and gas industry and the electric utility industry for steam power installations. Engineering work is now under way on the mill as well as modernization and enlargement of allied equipment. Completion is expected in late summer.

Engineering Study Center

Groundbreaking will be held this fall in Euclid, Ohio, for a $5 million engineering study center for Thompson Products, Inc. The project will resemble a modern "university type" development and house staffs for automotive, chemical, metallurgical, industrial engineering and new devices plus an administration section. First two to be erected will house the automotive, metallurgical and chemical sections. Final completion is expected in 1958.

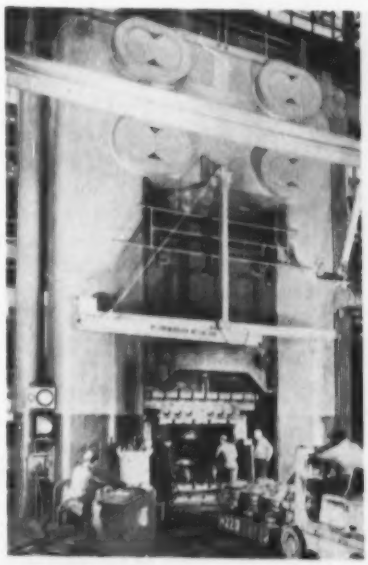
Will Spend More in '55

Steel firms modernized and expanded to the tune of $680 million during 1954, according to American Iron and Steel Institute. And the $6.3 billion total they've spent since World War II will be further boosted by an anticipated $695 million in 1955.

AISI reports one firm is planning to spend $50 million for new bar mill equipment, pipemaking facilities, wire-drawing equipment and a continuous galvanizing line. The firm is not alone in expanding continuous galvanizing—with 22 such lines now operating, 5 more are under construction and 9 are in the planning stage.

National Can Now No. 3

Third spot in the can industry was established by National Can Corp. with the acquisition of Pacific Can Co. The $19 million transaction culminated a 3-year reorganization and expansion program. National's sales last year topped $40 million with Pacific's at $32 million.



FORGING PRESS capable of exerting 8000 tons pressure is used by Aluminum Co. of America in making aircraft parts. Press weighs 4 million lb.

Robert Solinsky, National president, will be president and chief executive officer. E. F. Euphrat, formerly president of Pacific, will be chairman of Pacific. Other top management will remain.

Atlantic Plans Boost

Atlantic Steel Co. is going ahead with a $10 million modernization and improvement program which includes construction of a new merchant bar and rod mill (estimated cost $8,735,000), installation of a second electric furnace (cost $750,000), and construction of a new administration building (cost $450,000).

This is the second major postwar expansion program for the Atlanta steel firm and means that all told Atlantic Steel will have invested $16 million since the war.

DEFENSE

ATOMS: Push Weapons Program

AEC reports work on atomic aircraft engines, guided missile warheads . . . H-bomb power may be tripled . . . Research due bigger budget chunk—*By N. R. Regelmbal.*

♦ NUCLEAR WEAPONS are due in fiscal 1956 for their biggest production push so far if Congress goes along with the President's budget recommendations.

Forecasts call for bombs many times more powerful than the H-bomb tested last March; development of a "major new super weapon"; further research into nuclear engines for aircraft and better atomic propulsion units for ships, and increasingly productive studies of commercial power plants and industrial uses of the atom.

A revealing peek within the closely-guarded research and development closets of the Atomic Energy Commission is contained in its latest report to Congress.

Start New Tests

The report discloses that the AEC is already stockpiling H-bombs similar to that tested last year and says a major new weapon is in prospect. A civil defense official says that, while the bomb which was last tested had the force of 20 million tons of TNT, future weapons may have a force three times that great.

An antiaircraft guided missile with an atomic warhead for use in continental defense installations may be one outgrowth of the new atomic tests to start late this month, the report says.

AEC has let a contract, the report discloses, for construction of a vital phase of atomic aircraft experimentation. Authorities say the first atom-powered plane will be flying "within 10 years," and there are hints that the high-speed plane, of conventional size and weight but with almost limitless range, may be off the ground in 5 years.

President Eisenhower is asking $2 billion for atomic uses in his new budget, $50 million less than the current fiscal year's appropriation. But because almost all major building programs are for practical purposes complete, 21 pct more will go for research and development than this year.

Of the total, some $1.5 billion would be available to operate the atomic program in the new year. Of this, some $308 million will go for weapons; $118 million for reactor development; $43 million for physical research, and $100 million for securing and processing fissionable materials.

Industry's share in the program will come mainly from the reactor and physical research programs. While no estimates are given, there are indications that private industry's participation will be greatly stepped up in fiscal 1956.

AEC's report reveals that 1123 industrial firms are already using isotopes — 215 of them entering the field during the first 11 months of 1954. By states, there are 17 industrial users in California, 15 in New York, 14 in New Jersey, and 13 in Pennsylvania.

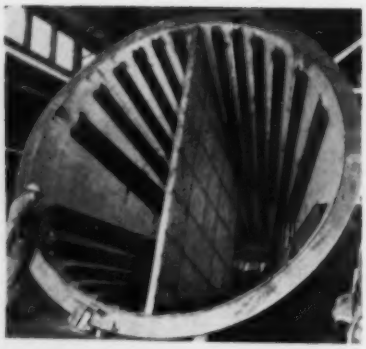
Delaware:

Argue case for U.S. funds for dredging channel

Proponents of the already-approved Delaware dredging project are preparing to take their case straight to Congress and perhaps will appeal directly to the President in their attempts to get approval for full federal financing. What is needed is a $25 million appropriation to get the ball rolling on the $91.3 million job.

They argue that deepening of the channel to 40 ft, while it will be of immediate benefit to U. S. Steel's Fairless Works, will draw hundreds of new industries to the Delaware Valley—"potentially the hottest industrial area in the country." They also fear they are being used as "guinea pigs" in an experiment by federal budget officials to try to get states or industry to foot part of the bills for river and harbor improvements.

In the words of Pennsylvania Governor George M. Leader, "If they are successful in this case, other developments, such as the Ohio River deepening, important to Pittsburgh, will be stymied by demands of local participation." He points out that there are at least a dozen other 40-ft channels in the country built entirely at the cost of the Federal Government.



MUFFLER for giant wind tunnel being built by Consolidated Western Steel Div. of U. S. Steel. Tunnels will operate up to Mach 5.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Radio set AN/VRC-19, 6 volts, 12 volts, 24 volts, 4800 ea, $4,471,912, Motorola, Inc., Chicago, Ill.

Battery, storage, 2205 ea, $486,750, The Eagle Picher Co., Cincinnati, Ohio.

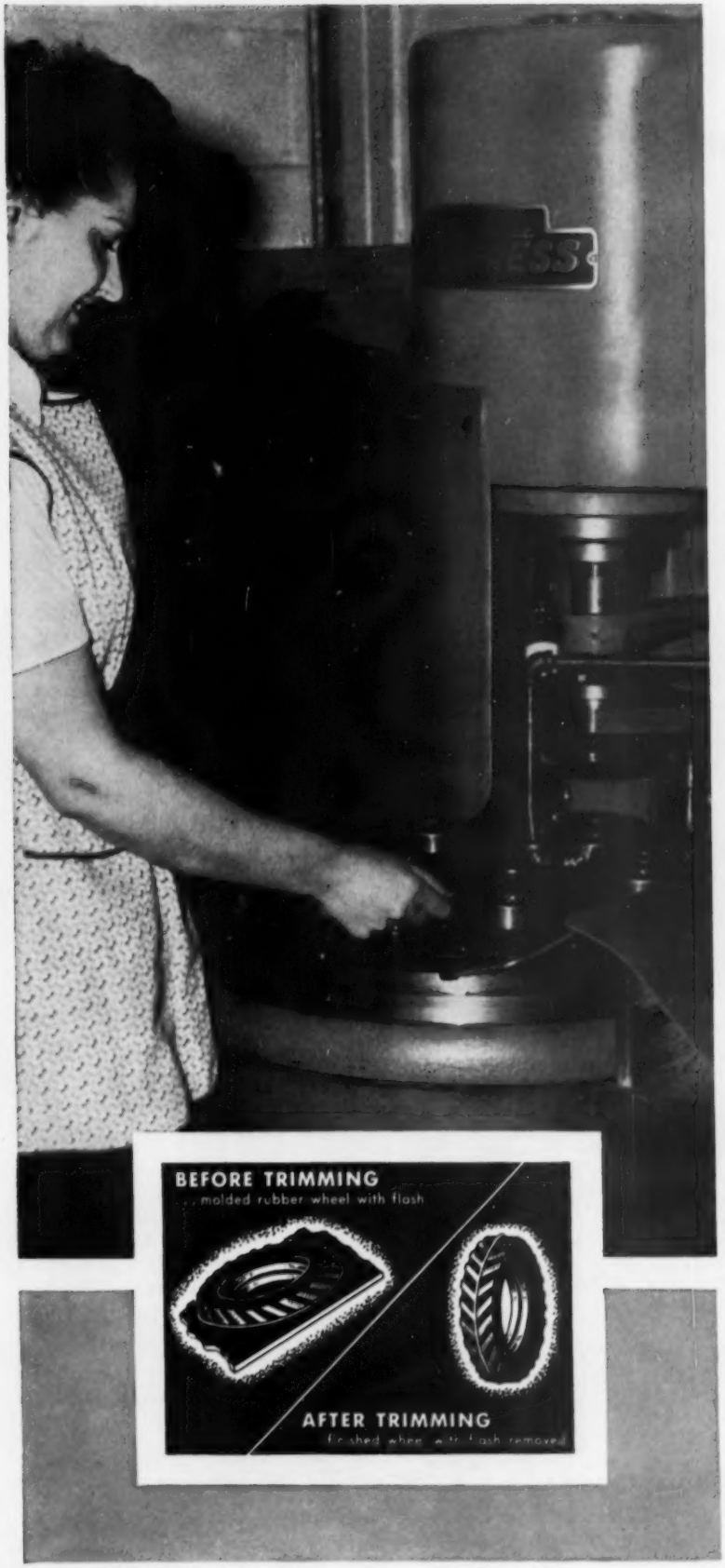
Battery, dry, BA-31, BA-270/U, BA-279/U, 330,900 ea, $1,179,082, Burgess Battery Co., Freeport, Ill.

Radar set, AN/MPQ, 77 ea, $5,427,347, Sperry Gyroscope Co., Div. Great Neck, N. Y., *George A. Dennis.*

Motor generators, 2500 ea, $662,623, Jack & Heintz, Inc., Cleveland, Ohio, *P. J. Barensfeld.*

Brake assys pr 00-179304, 5078 ea, $1,372,891, Bendix Prod. Div., South Bend, Ind., *G. I. Lyman.*

Brake assys, wheel assys, 3565 ea, $2,299,424, The B. F. Goodrich Co., Dayton, Ohio.



Eliminates 3 costly operations with DENISON® MULTIPRESS

Three time-consuming operations eliminated.

Production doubled.

A better product at less cost.

. . . all because of a switch to Denison hydraulic Multipress.

AT The Nye Rubber Company, Barberton, Ohio, the old method for trimming flash from molded rubber wheels required cutting, freezing, tumbling, buffing and washing—with parts loaded and unloaded by hand for each operation. Now, a 4-ton Multipress trims flash automatically.

The operator simply loads parts, which are carried under the ram by a Denison Index Table. One smooth hydraulic stroke trims the flash neat and close. Air blows the finished product down a chute for packing. The rate for one operator: 2400 parts an hour.

A switch to Denison Multipress could cut costly operations in your plant. Write for cost-cutting ideas and technical bulletins.

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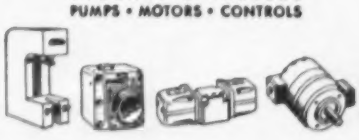


NEW KENDEX* TOOLING

costs less on all 3 counts

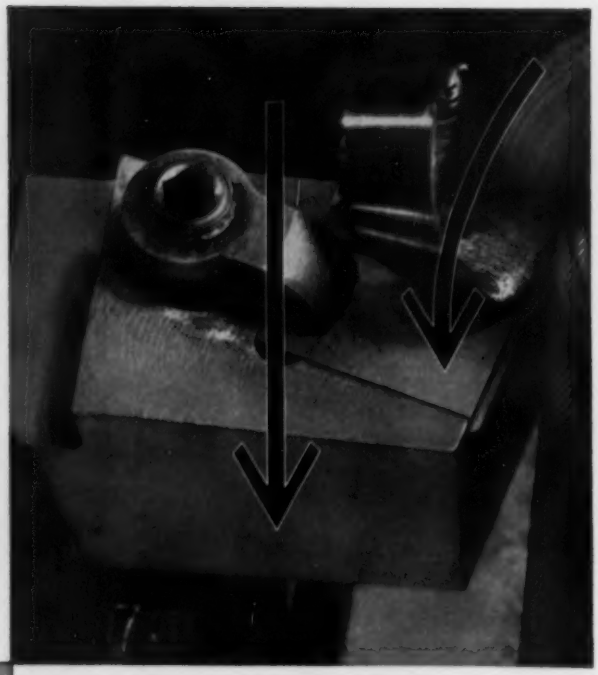
. . . initial cost, tool cost per piece and parts replacement cost

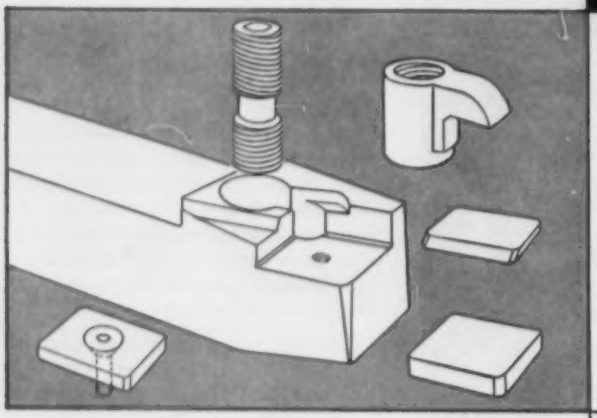
Each component of the *new* Kendex Tooling has been designed with but one thought in mind . . . lowest possible cost per cutting edge.

The holders are of simple but sturdy construction, and have the capacity to take deep cuts in a wide variety of operations. The clamp lifts for quick, accurate indexing, and is so designed that clamp forces are in the same direction as cutting forces—not opposed to them—to avoid counter stresses. Hardened, replaceable shims, on all but the smallest size, protect shanks in case of accidents with the tools. There is no complicated seat adjustment mechanism to weaken the Kendex shank. Kendex "turnover" inserts fit perfectly into place in accurately ground seats, and are supported by solid, heat-treated shanks. Center height of the cutting point is constantly maintained.

The new Kendex is available in a range of sizes in nine styles and two models: (1) Standard Tool used with or without replaceable chipbreakers, for a wide variety of average operations; (2) Heavy Duty model, with low cost, replaceable chip deflector, for cutting heavy and irregularly shaped forgings or castings where depth of cut may vary as much as one inch from side to side. *Both models use "throwaway" inserts . . . eliminate grinding.*

To learn how you can cut machining costs on all three counts, call your Kennametal representative, or write to KENNAMETAL INC., Latrobe, Pa.





The effectiveness of the rugged Kendex holder can be measured by its capacity to take a variety of cuts, from extra light to very deep, using the same tool.

Clamp forces are in same direction as cutting forces—and not opposed to them. This is indicated by the arrows in the above photograph. Counter stresses are thus eliminated, adding to tool life.

←The new Kendex is simple in design with a minimum of parts . . . no complex mechanism to adjust or fail. "Throwaway" type inserts index quickly and accurately in the rugged, heat-treated shank, with cutting edge perfectly aligned. Clamp has sufficient travel to hold insert when carbide chip-breaker is not used. Shim (where used) screws to holder.

The table below gives a comparison of initial cost of Kendex holder and hardware with a comparative, competitive tool. Note the low cost of replacement parts for the Kendex KAR 16.

TOOL COST COMPARISON

(1" x 1" shank, without inserts)

Toolholder "A"		Kendex KAR 16	
Holder only	$25.00	Holder only	$ 8.00
Hardware:		Hardware:	
Chipbreaker plate	$3.50	Shim†	$0.90
Elevator	4.25	Clamp	1.25
Main screw	1.00	Clamp Screw	0.15
Chipbreaker plate screws	0.35		2.30
	9.10		
Total initial investment	$34.10	Total initial investment	$10.30

†Hardened, replaceable shim absorbs stresses of any possible overloading beyond tool capacity. Inserts last longer and machining costs are held to a minimum.

*Registered trademark

5510

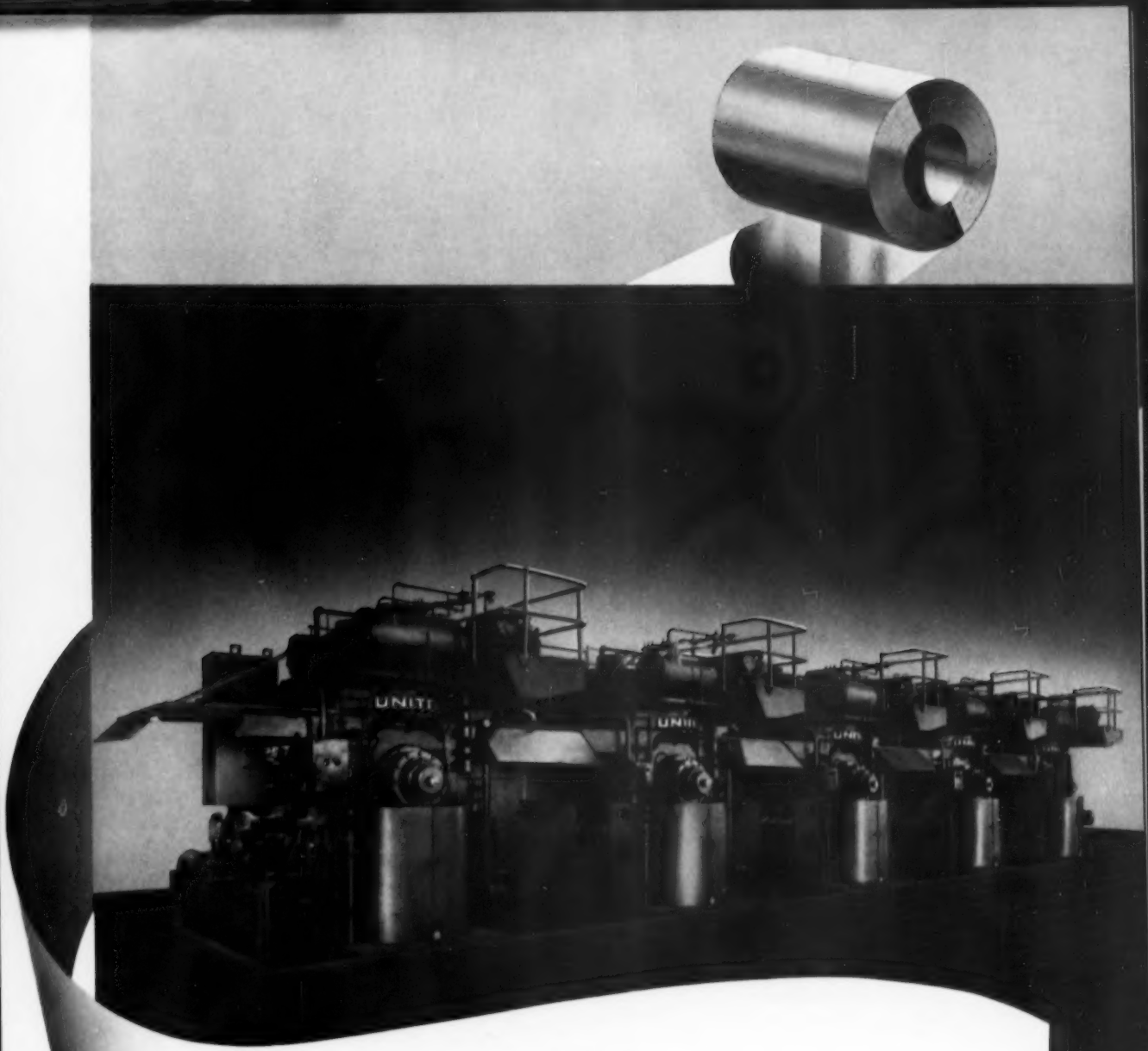
MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS

INDUSTRY AND KENNAMETAL ...Partners in Progress

ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS



UNITED

5-stand Tandem
4-high Cold Mill

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Pittsburgh, Pennsylvania

Plants at Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington (Lobdell United Division)

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Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

What is QUALITY in steel?

Here's one way you can look at it

You sometimes run into much loose talk about QUALITY in steel. From it you might gather that QUALITY is some highfalutin mark of distinction which divides steels into high or low classes—like a caste system!

There is no such thing.

One steel is as good as another. Everything depends on the *fitness* of a particular steel to make the job for which it was ordered—efficiently and economically. THAT'S THE TEST FOR QUALITY.

FOR EXAMPLE—Is Cold Rolled higher in "quality" than Hot Rolled? Is Stainless superior to Carbon Steel? APPLY THE TEST!

You might say that QUALITY in steel is a *particular combination* of gauge and/or size, workability and finish that best meets the mechanical and economic requirements of a *particular job* at a *particular time*.

Why a particular time? Because circumstances might make it necessary for you to relax your "ideal" specifications to keep a job running.

And this meaning of QUALITY holds true whether it's made-to-order mill steel or picked-to-order warehouse steel that you may be buying.

HOW ABOUT A DEMONSTRATION?

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YOUR GUIDE TO DSC MILL PRODUCTS

Hot Rolled and Cold Rolled Sheets
Low and Medium Carbon Manufacturers' Wire
High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement
Rope Wire Tire Bead Wire Welded Fabric
Cold Rolled Carbon Steel Strip
Cold Rolled Carbon Spring Steel

When you buy warehouse steel
call your nearest Reliance Customer Representative

T.M. REG. U.S. AND CANADA
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RELIANCE STEEL

DIV. DETROIT STEEL CORPORATION

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RELIANCE *Job-Fitted* PRODUCTS

COLD ROLLED STRIP — Coils Cut Lengths All Tempers
SHEETS — Cold Rolled Hot Rolled Pickled
Galvanized Long Terne

Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

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Report To Management

New Plant Outlays Up

Evidence is mounting that new plant and equipment expenditures this year won't drop so much as predicted. It was expectation of a decline in new plant and equipment outlays along with prospect of reduced defense spending that caused many economists to be cool on the '55 business outlook. Now it appears these forecasters are off base.

New plant and equipment expenditures last year totaled about $26.7 billion compared with $28.4 billion in 1953. Some experts have figured outlays this year would be down to about $25.4 billion, other forecasters have been even more pessimistic. But best guess is that new plant and equipment expenditures this year will equal, perhaps top last year's figure.

Here's why the forecasters underestimated the amount manufacturers will spend on new plant and equipment:

(1) Many of the predictions were made in the latter part of 1954 before the economy's full recovery phase was apparent to most businessmen. Now optimism is the byword in industry, so manufacturers are feeling more expansive about their new plant and equipment plans.

(2) Many forecasters have been thrown by the fact that in the postwar years most industries expanded so much that they now have more than enough capacity to take care of current demand. This is true—what's overlooked is that stiff competition is forcing manufacturers to find ways to cut costs, diversify output and improve product quality. This means that though not so much will be spent to increase production, more will be paid out to increase efficiency.

Will Do Better Than Last Year

Backing up the belief that plant and equipment outlays will be substantial is forecast by National Constructors Assn. that 1955 will be "another good year—better than 1954."

Volume of new contracts for industrial builders has been increasing since the start of the fourth quarter. Showing particular promise is power plant work. This field will be solid for at least the next 10 years. Also industrial builders can expect a large volume of work in chemical plant and petroleum construction.

The Economy Gets Another Push

One of the important items that will swing from last year's minus rating to the plus side in '55 is business inventories. During most of '54 business inventories were being cut at a $4 billion-per-year rate, but latest government figures show inventories were rising during November. This marked the first increase since December, 1953. The shift from cutback to buildup (addition to stocks this year will amount to around $2.5 billion) can't help but hypo business activity.

Big Year For Gas Appliances

Watch for gas appliance manufacturers to set new sales records this year, topping even the all-time highs established in 1950. Outlook is particularly promising for gas furnace manufacturers who should top even their record factory shipment level of 670,000 units set last year. And 1955 is also shaping up as a good year for makers of gas ranges, water heaters, conversion burners, clothes driers, and gas-fired hotel and restaurant equipment.

Shift Into High

It's gears that make machines go 'round and it's apparent a lot more machines are being circulated. American Gear Manufacturers Assn.'s monthly index was up a startling 56 pct in December from the previous month. Also the December mark of 182.2 (1947-1949 average equals 100) is the year's highest. For all of 1954 the index averaged 151.9, 8.4 pct under the '53 levels and 4.3 pct over 1952.

INDUSTRIAL BRIEFS

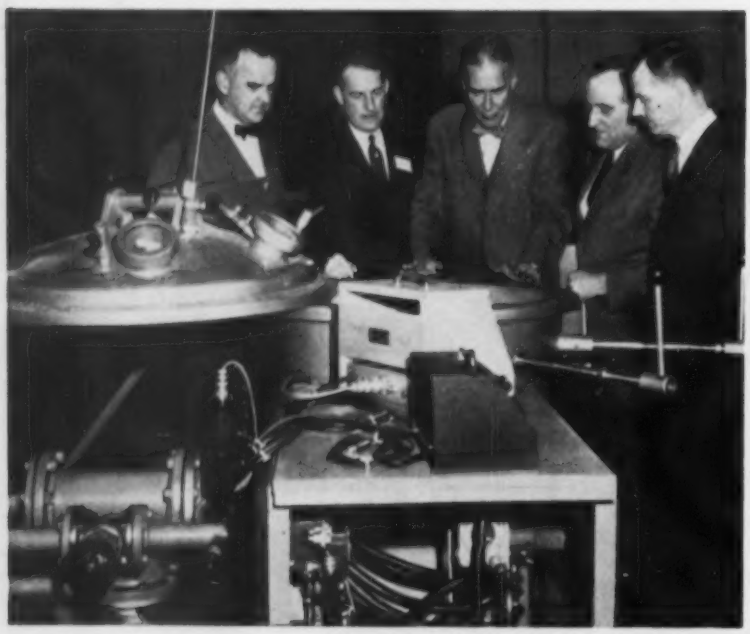
New Prexy . . . National Constructors Assn. has elected T. C. Williams as its president. Mr. Williams is executive vice-president, Stone & Webster Engineering Corp., Boston.

Acquired . . . Smico, Inc., Oklahoma City, Oklahoma, has acquired the complete milling and processing business of The Wolf Co., Chambersburg, Pa.

Texas Office . . . Preston Machine Tool Sales Co. opened an office at 104 Professional Bldg., Arlington to serve the north and northwest area of Texas better. K. Carr and R. Banning are the sales engineers for the office.

"Iron Man" . . . More than 650 Armco Steel Corp. men and women welcomed the company's top safety award, the famous "Iron Man," on its return to the Middletown Works last month. Every year since 1926 it has been awarded to the safety group in the company's plants which has the lowest number of lost-time accidents per million man hours worked.

First Suggestion . . . Westinghouse Electric Corp., Pittsburgh, awarded Robert Felt $4375 for suggesting a new purchasing policy for insulating oil used in circuit breakers and transformers. It was the first suggestion Mr. Felt ever submitted.



HUNDREDTH commercial-size vacuum furnace built by National Research Corp. is inspected prior to shipment to Britain by (l to r) Board Chairman W. A. Coolidge, President R. C. Morse, Massachusetts Gov. C. A. Herter, Richard Preston, commissioner of Massachusetts Dept. of Commerce, and William Barker, British consul general in Boston.

Declares Dividend . . . Stewart-Warner Corp. declared a regular quarterly cash dividend of 40¢ per share of $5 par value capital stock payable Mar. 5 to stockholders of record at the close of business Feb. 11.

Settled Differences . . . F. H. McGraw & Co. has announced that its differences with Jones & Laughlin Steel Corp. with respect to the design and construction of a coal washing plant completed for J&L in East Fredericktown, Pa. in 1949 have been settled.

Completed . . . Kropp Forge Co., Chicago, has completed a $6 million improvement and expansion program providing new facilities for all phases of forging operations, including the production of larger and more complex forgings for Army aircraft parts.

"Man of the Year" . . . Frank B. Rackley, president of Jessop Steel Co., Washington, Pa., was named a "Man of the Year" by Pittsburgh newspapermen at their annual Page One Ball recently.

Gets Contract . . . Koppers Co., Inc., Pittsburgh, has been awarded a contract for the design, engineering and procurement of certain equipment in the construction of what is said to be the largest blast furnace in Spain. The furnace will be built at Aviles, Spain by the Empresa Nacional Siderurgicia, S. A.

Named Distributor . . . Gairing Tool Co., Detroit, appointed Allied Tool & Abrasive Co., 3314 Fruitland Ave., Los Angeles, as distributors in southern California.

Research Center . . . American Society of Tool Engineers has acquired 32 acres for a research center near Ann Arbor, Mich.

Brainard triples electro-galvanized steel capacity to give you faster service

● A new Brainard plant triples capacity for electro-galvanized steel . . . assures you fast service on standard or special orders. Brainard's fully integrated operation, from ore to finished products, gives you a dependable source of supply at all times.

Brainard electro-galvanized steel has a built-in finish . . . plating and finishing costs are eliminated. Coating provides permanent protection against rust and corrosion. Coating thickness can be supplied as specified.

Brainard

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AUTOMOTIVE ASSEMBLY LINE

Packard First To Use Plastic Dies

Automaker uses new method to make body panels for luxury hardtop . . . Could not have met release deadline with steel dies . . . The 60 pct savings in tooling costs may be salvation of the independents—By *R. D. Raddant.*

◆ IT REQUIRED one of the so-called "smaller companies" to take the plunge with the first significant use of plastic dies for passenger car production.

With necessity in this case being the mother of invention, Packard Div. of Studebaker-Packard Corp. utilized plastic dies to produce the luxury hardtop Packard 400. Success of the move spelled the difference between having the line and not having it, both in terms of time and cost.

It was a most important move to Packard officials, who reached the conclusion that a hardtop in the 127 in. wheelbase size was an absolute necessity to compete with Cadillac, which was on the verge of running away with that segment of the business.

Needed Longer Body . . . To review the situation, Packard had hardtop styling in the 122 in. wheelbase body style. But, facing facts, Packard decided it was not competitive in the high priced bracket. It was decided to lengthen the body to fit the 127 in. chassis. The next question was how to do it.

Lengthening a body isn't exactly a new trick in the auto industry. In this case it amounted to stretching by 5 in. the upper back panel, the center floor panel, the inner quarter panel, the floor pan wheel house and, most important, an entire new rear quarter panel extending the basic styling to the rear wheels and extending the rear overhang.

But time was important and so was money. For the limited production of a smaller manufacturer, cost of steel dies was prohibitive. On April 1st, 1954, the decision was made to go ahead with plastic tooling. By that time steel dies could not have been ready in time for the 1955 model introduction.

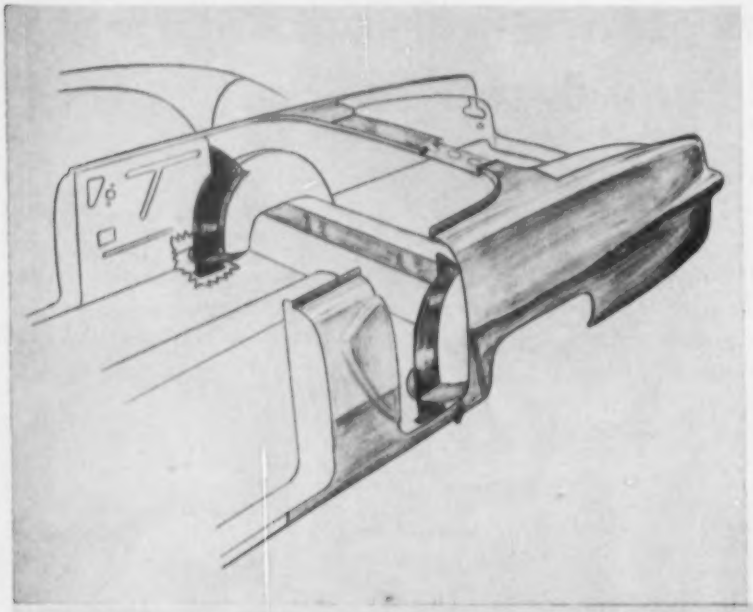
Cut Costs, Time . . . Roger E. Bremer, vice-president in charge of product planning and programming, told THE IRON AGE that plastic tooling saved 60 pct of tooling costs and months of time.

"As a result, that one move permitted the production of a complete line of cars that would not have been possible by conventional methods," he pointed out.

It solved, at least in part, one of the major problems of a smaller producer, the cost penalty connected with small volume. It will help Packard take greater advantage of interchangeability of parts, provide more body stylings on fewer body shells.

Permits More Change . . . "For us to be flexible," Mr. Bremer said, "The key appears to be plastic tooling. It will result in more frequent body changes and far more extensive face liftings."

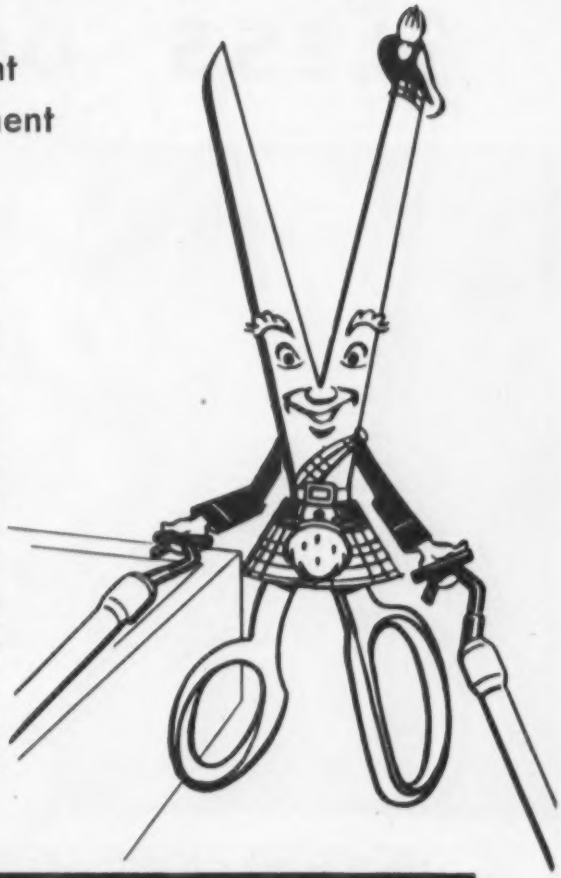
To date, use of plastic dies has



FIRST PLASTIC DIES ever used for passenger car production enabled Packard to speedily create its exclusive new "400" model. Shaded areas show panels and inserts required to lengthen wheelbase from 122 in. to 127 in. on hardtop model.

New-type anodes reduced plating costs

"Mr. Cost Cutter" shows how plant offset expense of the new equipment with actual dollar-savings



AT ONE plant, ordinary flat lead anodes used in chromium plating needed costly weekly maintenance to remove insulating deposits which built up on their backs. Two men worked a full day each week at overtime—lifting out anodes, brushing them clean, and correcting warpage from overheating.

An original development by United Chromium—*cylindrical* anodes—was brought to this plant's attention by The Unichrome Man. First order for anodes came to $1560.

What a difference the Unichrome Round Anodes made!

Weekly maintenance stopped. The round shape gave better current distribution which ended the need for cleaning. Its rigidity stopped the warping. The payoff: Unichrome Anodes have saved as much as their original cost in reduced maintenance. In addition, they are delivering better plating with lower current and voltage—thereby enabling a standby $29,000 generator to be transferred to other work in the plant!

Here you have another example of how putting United Chromium's long metal finishing experience to work means savings on equipment. May we put it to work for *you*?

MORE WAYS UNITED CHROMIUM HELPS TO SAVE ON COATING OF METALS

More durable protection

Only Unichrome Coating 218X is now used to insulate zinc plating barrels in one automotive accessory plant... because it proved to be the most durable of all plastisol coatings tested for this job, and therefore the most economical.

Plans to production—faster

When one company recently decided to chromium plate diesel engine crankshafts, they called in United Chromium to plan and supply materials and equipment for the operation. Result: The plant is pleased with the speed with which they got a smoothly running efficient set-up.

Chromium plating economies

Recent reports show: Unichrome SRHS Chromium Solution cut power costs 60% for one user. . . . It saved about $3000 a year for another plant by cutting daily bath additions from former 500 pounds down to 300. . . . It gave a shop 66% more capacity with existing equipment.

UNICHROME
Trade Mark

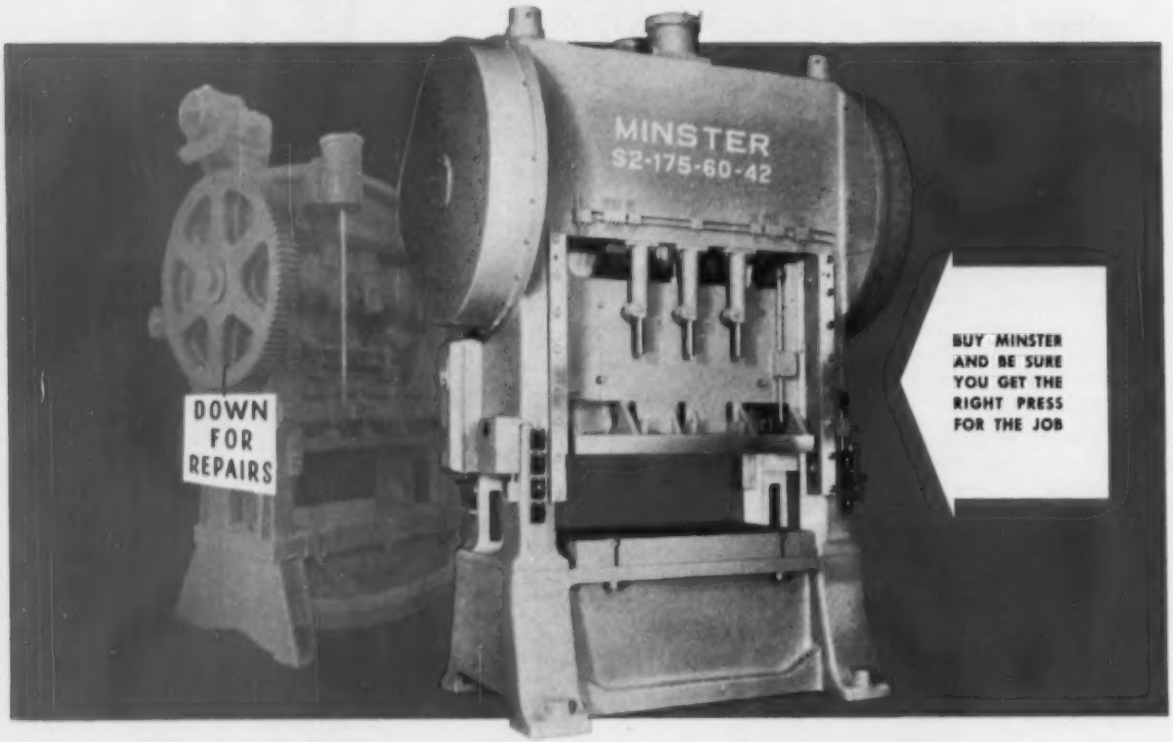
UNITED CHROMIUM, INCORPORATED
100 East 42nd St., New York 17, N. Y.

To finish it better and SAVE call in "The Unichrome Man"

United Chromium offers you the advantages of: (1) 25 years of specialized experience in metal finishing; (2) Wide experience in both organic and plated finishes; (3) A diversified line of products for decorative and functional finishing—including plating processes and equipment, protective coatings, chemical conversion coatings for zinc; (4) Thinking geared to cost-cutting, product-improving possibilities.
We'd welcome an opportunity to help you "Finish it better AND SAVE."

Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Calif. In Canada: United Chromium Limited, Toronto, Ont.

A Minster Press means
LESS DOWNTIME



Here is why Minster Presses on the job mean more production hours and less downtime for press repair!

1 ADVANCED DESIGN to give you the value of the best practices and latest improvements in presses . . . Box type construction for less deflection and better bearing support . . . Slides having longer ways fully supported and widely spaced . . . Large diameter connection screws . . . Method of taking up wear in lower connection bushings . . . Barrel slide adjustment on all sizes over 60 ton.
Clutch controls, both air and electrical, to improve press operation and production methods.

2 MINSTER'S PATENTED COMBINATION FRICTION CLUTCH AND BRAKE . . . One single automatically synchronized unit having air engaged multiple disc clutch and spring applied brake . . . Fast controlled engagement or disengagement at any point on 360° surfaces . . . Shock absorbing action . . . Exceptional friction surface life. *No more sledge hammer engagement, fast wearing and hard to fit replacement parts.*

3 PRECISION FITTING where it counts . . . Ways scraped to master gauges and square to the slide face . . . Bed scraped to surface plate . . . Bearing bores and bushings honed to fit . . . Ground spacers for maintaining proper gib clearance . . . Ground and roll burnished crankshafts.

4 MAINTENANCE INFORMATION AND OPERATOR INSTRUCTION applying to your press . . . A guide to preventive maintenance and operator training.

Let Minster help you plan your press replacement program

THE MINSTER MACHINE COMPANY
MINSTER, OHIO

MINSTER®
PRESSES

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Feb. 5, 1955	179,909	19,322
Jan. 29, 1955	167,190	23,278
Feb. 6, 1954	117,169	21,873
Jan. 30, 1954	119,094	24,560

*Estimated. Source: *Ward's Reports*

not been extended to the Studebaker Div., but holds great possibilities there as well. Plastic dies would be particularly adaptable to the President line, which has a moderate volume.

Packard had very little trouble in using the plastic dies, which were made from a phenolic resin on steel hold-down rings by Richard Brothers Div. of Allied Products Corp. After some experimenting with the hold-down and tightening, Packard was able to get good, clean panels.

From Clay to Plastic . . . Plastic tooling also saved considerable time and expense in that plastic casts were made off the clay model so the die could be designed and ready when the die model was completed.

Die models were shipped to the diemaker Sept. 9, 1954, and Packard had panels by late December. Conventional time advertised by a major diemaker is 36 weeks with advance information.

The purpose of the whole program was to boost Packard's hardtop production. Success is indicated in the figures. Packard's hardtop percentage of 1955's runs 40 pct.

Production:

Speed and greater precision up use of shell molding.

Automakers have tended to treat shell molding as a top secret process, although it has been known for a period of several years that Ford and GM, as well as others, have made extensive use of the process where practicable.

In General Motors own Engineering Journal some of the many products that are shell molded at the Central Foundry Div. were recently described, together with the economic or technical reasons for using the process.

One part is a grey iron manual-control valve for a military vehicle automatic transmission. Adverse expansion and wear characteristics made aluminum die castings unsatisfactory. Only shell molding made it possible to adhere to the close tolerances required for the part.

Make 4500 Parts Daily

Over 4500 governor bodies and bushings for another automatic transmission are being produced daily by shell molding. Parts formerly were made of aluminum die castings, but steel piston rings used in conjunction with the governor body caused excessive wear. Where it was previously impossible to cast the part in ferrous material, shell molding made the present high rate of production comparatively simple.

Shell molding reduced substantially the number of machining operations for a trigger housing for an automatic rifle. Grey iron housings for automotive power steering units are shell molded, principally because of six internal grooves that were almost impossible in any other process.

AUTOMOTIVE NEWS-

Set Idea Record

For the third consecutive year General Motors employees set new records for participation in the Employee Suggestion Plan during 1954, according to Harry W. Anderson, vice-president in charge of Personnel Staff.

"In 1954," Mr. Anderson said, "GM employees dropped 192,030 suggestions in the suggestion boxes. This exceeded the 1953 record by more than 10,000 suggestions."

Last year 46,995 suggestions were adopted and put into effect at GM. For every suggestion adopted an award was paid and these awards totalled $2,467,513.83. Both of these totals also are new records.

GM's employe suggestion plan was started on a company-wide basis in 1942. Since that time, employees have submitted 1,318,400 suggestions, 310,511 suggestions have been adopted and awards have totaled $14,119,764.

THE BULL OF THE WOODS — **By J. R. Williams**

OH, TUCK! TELL THIS GUY TH' FUNNY THING THAT HAPPENED ON HERE LAST WEEK!
THAT'S TH' CARTOONIST WHO USED TO WORK HERE--HE'S AFTER IDEAS!
YEH, HE'S USED UP ALL TH' IDEAS ON LITTLE EASY-TO-DRAW MACHINES--NOW HE'S HAVIN' TO DRAW TH' ONES AS BIG AS BATTLESHIPS WITH A WEAK IDEA, WHEN IT'S A DAY'S WORK FOR HIM TO DRAW EVEN A CANOE!
2-11
J.R.WILLIAMS
"THE BIG TIME"

BUILDS EXTRA SELLING POWER INTO YOUR PRODUCTS

the RIGHT
strip steel, hot or cold rolled,
makes a difference
HERE

Strip steel—hot or cold rolled—precisely exact to *your* specifications is an ALAN WOOD specialty. This specialty . . . and our long-established principle of "custom-producing" under the highest standards known . . . ensures you of the "right" strip for your products. In turn, this "rightness" means fewer production headaches . . . and consistent, durable quality which helps build your product's reputation and sales.

If you require strip or sheet steel . . . choose an integrated steel specialist with modern, up-to-date continuous mills . . . one who understands your production problems and delivers according to your specifications.

IRON PRODUCTS
"Swede" *pig iron*
STEEL PRODUCTS
Plates (sheared)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip
ROLLED STEEL FLOOR PLATE
A.W. ALGRIP *abrasive*
A.W. SUPER-DIAMOND *pattern*
A.W. CUT NAILS
MINE PRODUCTS
COKE
COAL CHEMICALS

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SM-13

THIS WEEK IN WASHINGTON

Formosa Crisis Won't Up Defense Pace

Pentagon sees current rate of defense spending adequate . . . Holds military buildup since 1950 good enough to support limited-scale, hot war . . . Evidence points to Eisenhower's running in '56—By G. H. Baker.

◆ AS FAR AS government spending is concerned, the Formosan crisis is not going to bring on any big increase in military purchasing. For the time being, at least, the Pentagon believes the current rate of procurement is ample to supply any Army, Navy, or Air Force operations in the Formosan area, since any action there would probably be of a limited nature.

In the five years that have passed since the outbreak of the Korean war, the U. S. military machine has been steadily beefed up so that foreign defense operations might be taken in stride. That policy is now paying off. There's no hysteria in Washington procurement offices, no frenzied plans to "buy everything in sight."

Plan No Controls . . . Thus far, President Eisenhower has asked Congress for no new wartime authority. This indicates that he believes U. S. business and industry are well equipped to support a limited war.

The White House has no immediate plans for clamping on controls over prices, wages, materials, and end-products—but it doesn't promise not to invoke these controls if later on they are deemed necessary.

Looks Like Ike . . . It looks more and more like Ike is to be the Republican nominee for the Presidency next year. And, judging by current political signs, he will win the race if he enters it.

It is important to keep in mind that Mr. Eisenhower's decision—he emphasizes to callers that it is tentative — may necessarily be changed. He tells visitors that the turn of national or world events may alter the circumstances surrounding his decision. He goes even farther, and broadly suggests to Republican leaders that they avoid thinking of him as their only candidate.

Wants Younger Men . . . He tells them the GOP has been slow to promote the political futures of some younger men, and openly hints that it wouldn't hurt the party to start booming the wealth of talent that it has in its ranks of younger men. [Relatively.]

Mr. Eisenhower's modesty is an endearing trait to the public. But party leaders say his modesty is a luxury they cannot afford. They recognize him as a sure vote-getter, and they have no intention of letting him bow out of politics. His health and welfare permitting, they intend to renew his lease on the White House.

Reduce Tax Data . . . As an employer, you may get a break this year on the volume of records you must prepare and submit to the federal government.

The Eisenhower Administration is asking Congress to rewrite the tax laws so as to require only one annual report which would combine data on employee income taxes and social security taxes.

Under existing law, employers must file reports on social security tax withholding every calendar quarter. Separate annual reports are required on income tax withholding. Idea is to combine these two withholding reports into one annual report.

Treasury experts estimate that employers now must file social security reports with the government on about 200 million workers. This imposes an enormous burden of paper work, both for employers and the government.

More Defense Steel . . . Greater quantities of steel, but less copper, will be set aside for defense and atomic energy programs in the April-June period, as compared with the current quarter.

Steel allotments for "A" products in the second quarter amount to just over 681,000 short tons, or about 80,000 more than were earmarked for prime contractors and producers of military-type items during the present period.

Copper requirements, placed at more than 70.4 million lb in the first quarter, are to drop to 62 million lb.

Although the allotments are newly announced, the Defense

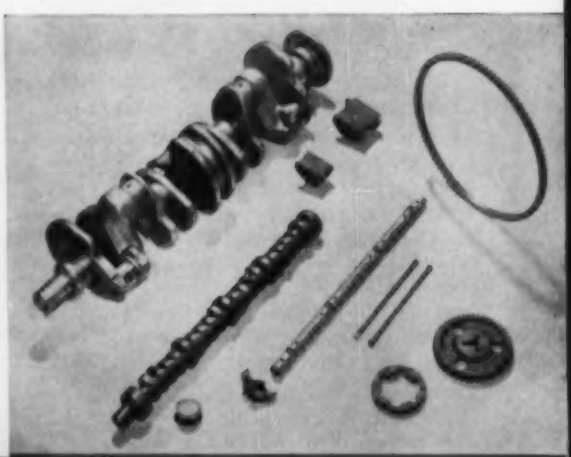
what's new?

NO. 28 OF A SERIES.

flamatic hardens crankshaft bearings

10/hr. to 70/hr.

It's no wonder the automotive industry turns to **flamatic** for selective heating precision. This machine, for example, provides the flexibility for development work on a variety of crankshafts or small lot production up to 10 parts/hour, simultaneously hardens main and pin bearing diameters in one operation. Interchangeable flame heads, adjustable flame head holders, and movable tailstock permit quick changes from one size to another . . . Another **flamatic** hardening machine for one size crankshaft hardens 70 parts/hour. Single- or multi-purpose **flamatic** machines have met production requirements on many automotive parts, a number of which are shown at the right. Write for new **flamatic** catalog, Publication No. M-1861.



CINCINNATI **flamatic**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U.S.A.

Dept. and Atomic Energy Commission computed their requirements for these materials late in 1954.

Improve Engineering Minds . . . How to sharpen the ability of engineers to solve problems is described in a new government report. Tests conducted by Northwestern University at the request of the U. S. Navy in descriptive geometry and engineering drawing show that the ability of the individual to solve problems can be stepped up considerably if initiative and originality are cultivated in the right way.

Copies of the report ($5) are available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Ask for Report PB 111449, "Developing Problem - Solving Skills in Engineering."

Machine Tools:

Name Vance to head committee to study defense tool buying.

Mobilization needs in the machine tool and production equipment fields will be reviewed carefully by a new government committee under Harold S. Vance, chairman of the Executive Committee, Studebaker-Packard Corp., South Bend, Ind.

Known as the Advisory Committee on Components and Production Equipment, the group will consult with Defense Mobilizer Arthur Flemming on plans for eliminating capacity shortages in critically-needed items.

Machine tool builders were given a hint as to this forthcoming action when they were told at a recent Washington meeting that new weapons programs require a reappraisal of government machine tool buying plans.

Name Five Members

Members of the new Vance committee include William C. Foster, president of the Manufacturing Chemists' Assn., Inc., Washington; Leroy Lutes, president of Pacific Tire & Rubber Co., Oakland, Calif.; John L. McCaffrey, president of International Harvester Co., Chicago; K. B. Wolfe, president of the Oerlikon Tool and Arms Corp. of America, Asheville, N. C.; and Earl W. Mills, president of Foster Wheeler Corp., New York.

Deficiences in a number of selected components have been studied for some time by a separate group representing the Defense and Commerce Depts., Atomic Energy Commission, and General Services Admin.

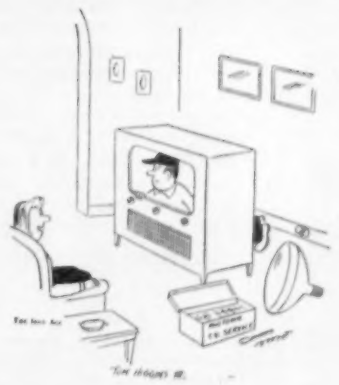
Items surveyed include large steel castings, ball and roller bearings, aluminum forgings, various types of gears, and compressors, fans, and blowers.

Aid Small Business

Continuing efforts are aimed at lining up as large a share as possible of defense contracts for companies with fewer than 500 employees, Small Business Administration says.

The agency expects very beneficial results from its recent assignment of an SBA representative at the Pentagon. Officially predicted is "closer integration" of the SBA-Defense Dept. small business programs.

In approximately a year and one-half of operation, the agency reports, more than $400 million in military orders have been set aside for award to small firms. Actual awards are appreciably lower in dollar value, amounting to about $180 million worth.



"The picture is perfect—hold it right there."

WASHINGTON NEWS

Air Pollution:

President, Congress propose research, tax aid plan.

Air pollution, for years a problem that has demanded the attention of industrial scientists and municipal research specialists, is attracting more interest at federal government levels.

Both at the White House and on Capitol Hill, there is increasing concern over the health hazards which may be created by smog and other types of dense air.

In his recent health message, President Eisenhower called attention to anxiety over the smog situation in many urban areas by proposing intensified research into air pollution. Around some cities, he said, the atmosphere "may be approaching the limit of its ability" to absorb pollutants.

He is seeking more money to permit the Public Health Service to gather pertinent data on smog and to produce better control.

A number of congressmen have offered bills this year advocating thorough research into smog causes and control or to stimulate the use of anti-pollution equipment. One interested lawmaker, Rep. Gordon L. McDonough, R., Calif., has introduced H.R. 2417, calling for fast tax write-off privileges for firms installing industrial anti-pollution devices.

Terms of the measure would coincide with the depreciation language in the new tax law, permitting a firm to shift from fast to slow writeoff methods as desired.

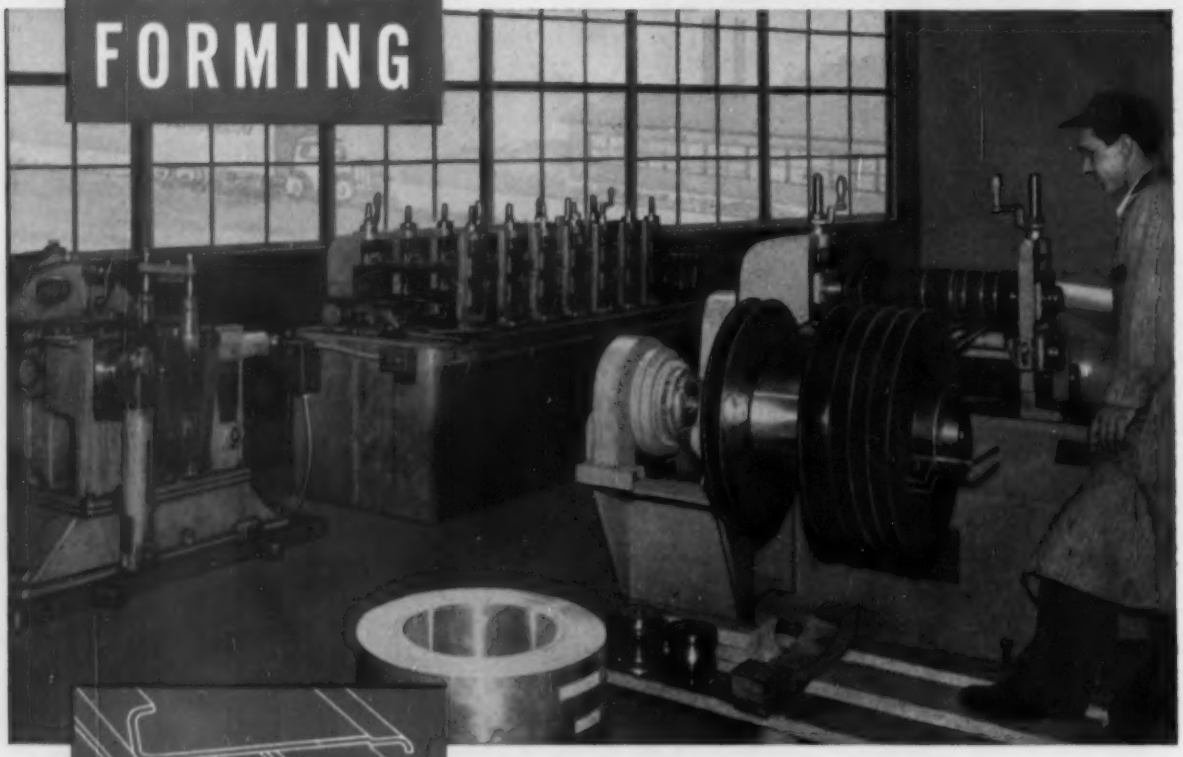
End Phantom Freight

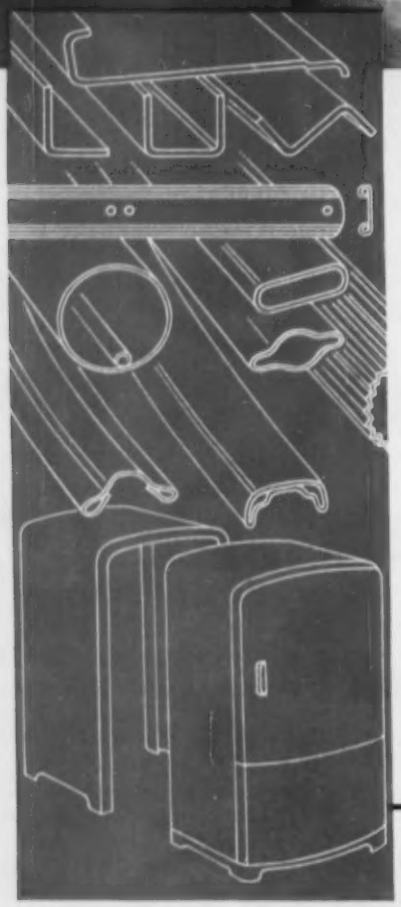
A measure to prohibit manufacturers from levying "phantom freight" charges—fees attributed to freight or transportation in excess of actual costs—is now under consideration by the House Commerce Committee.

The measure would ban delivery overcharges.

COLD-ROLL FORMING

Yoder Cold Roll Forming Machine with Shear Type Automatic Cut-Off and Small Slitting Line installed by Wolverine Mouldings, Inc., Lincoln Park, Mich.





for the Growing Business

● As your business grows, new opportunities arise for drastic cost reduction through the use of cold roll formed parts or finished products.

Decorative metal mouldings is only one of a great many things you can make with a Yoder cold-roll forming machine.

For instance, you can economically make structural angles, channels, etc., up to ½ in. thick. You can form wide sheets or panels into cabinets or shells for refrigerators, ironers, lockers, radio and TV sets, etc. You can make virtually all the components for metal buildings, including trusses, joists, studs, siding, roofing, windows, and doors.

Edges of shapes can be folded in and over to make interlocking joints for cabinets, rolling doors, box and tubular products.

You can, in addition to longitudinal forming, do perforating, notching, embossing, coiling, curving, welding, etc. Sections can be cut to length and ends given almost any shape, plain or fancy, by means of one or two Yoder automatic cut-off machines synchronized with the forming speed.

The Yoder Book on Cold-Roll Forming is an illustrated treatise on the art, the machines and many of the things they can do to reduce cost and increase production. A copy is yours for the asking. Consultations and estimates without cost or obligation.

THE YODER COMPANY • 5510 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

★ COLD-ROLL-FORMING and auxiliary machinery
★ GANG SLITTING LINES for Coils and Sheets
★ PIPE and TUBE MILLS — cold forming and welding

ENGINEERING YODER MANUFACTURING

WEST COAST REPORT

Shipbuilders Need Sustained Output

West Coast's 42 shipways are half of U. S. capacity . . . Employed 600,000 in World War II, only 53,000 today . . . Industry's leaders cite need for steady work flow to keep skilled labor supply—By *R. R. Kay.*

◆ WEST COAST shipbuilding and ship repair industry — mighty World War II Goliath with hearty appetite for steel—is a neglected, starving orphan today.

The industry, which employed as many as 600,000 during the war, now has jobs for only 53,000. And 40,000 of these are in government yards.

Privately-owned shipyards, with investments running into the hundreds of millions of dollars, are mere shadows of their former selves. From San Diego to Seattle they're operating at only 8-9 pct of capacity.

Sees Slight Improvement . . . Mario Grossetti, business manager of Local 9 (San Francisco), Shipfitters & Helpers, union of all West Coast shipyard workers, told THE IRON AGE, "The outlook is very bad." He admits things are a mite better now than they were. "Two years ago there was nothing in the private yards."

He claims the West Coast has about half of the nation's shipbuilding tonnage capacity. And, he insists, "We can handle everything that's done on the East Coast."

The industry is always in a state of feast or famine. "We get some repair jobs that last several months. Then the skilled workers drift off to other jobs. We need a regular and continuous shipbuilding program so we can maintain facilities and skilled help," Mr. Grossetti says.

Need Sustained Program . . . T. C. Ingersoll, general manager of Bethlehem Pacific Coast Steel Corp.'s shipbuilding division, agrees: "We need a sustained shipbuilding program to maintain our competitive position."

Mr. Ingersoll says it isn't too late even now to help the stricken West Coast industry. "Quite a few yards could be reactivated without too much expense."

Bethlehem Pacific and Puget Sound Bridge & Dredging Co., Seattle, each has contracts for two destroyer escorts, due for completion in 1957. Each ship will need about 650 tons of steel. The jobs will boost employment to a peak of about 1200 next year at Bethlehem's San Francisco yard; the same at Puget Sound.

May Build Tankers . . . Bethlehem expects to launch the last of a series of five Mariners next May. Some 6600 tons of steel go into each of these high-speed cargo vessels. The company buys most of its plate from western mills.

"That is NOT the way I taught you to point!"

And contracts for 15 tankers which could be built in Bethlehem's San Francisco yard are still in the talking stage. Awards may soon be announced.

Convert Cargo Ships . . . Looking ahead, Mr. Ingersoll says Matson Navigation Co. and American President Lines, Ltd., are slated to have eight big conversion jobs on C-4 cargo ships for West Coast yards soon.

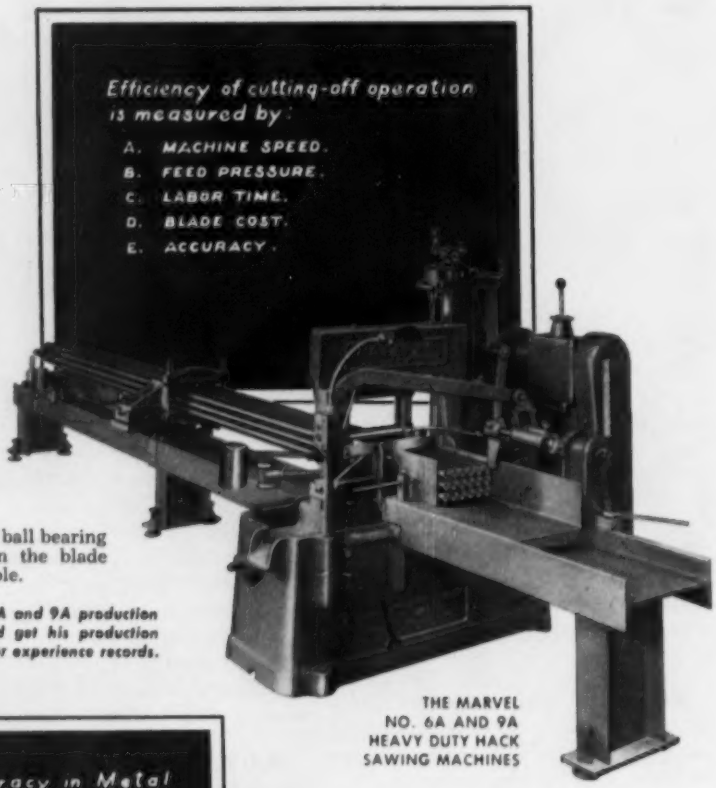
What are the private shipbuilding facilities on the West Coast? According to Mr. Grossetti, the larger yards have a total of 42 shipbuilding ways: southern California, 5; San Francisco Bay Area, 24; Seattle area, 13. They range to 660 ft long, 98 ft wide. Many are easily expandable. And there are about 30 small operators on the Coast.

Buys Union Steel . . . It's official now . . . Kaiser Steel Corp., Oakland, Calif., bought Union Steel Co., Los Angeles, for "several millions of dollars" and will run it as its Fabricating Division. The move into the fabrication and erection business (see THE IRON AGE, Jan. 27, 1955, p. 57), was confirmed by Jack L. Ashby, Kaiser Steel's vice-president and general manager.

Kaiser got Union's 16½-acre site, with some 185,000 sq ft of plant space, and about 300 employees. In addition to steel fabrication and erection for bridges, freeways, and buildings, the facilities are used for manufacture of aircraft and missile components, mobile and stationary launching platforms for missiles.

Efficiency in Cutting-off is Important

Practically all machining operations start with pieces cut-off from bars or billets. Hence, inefficiency, or lack of capacity, in the cut-off department can hold up or stagnate the entire plant.



THE MARVEL NO. 6A AND 9A HEAVY DUTY HACK SAWING MACHINES

A. Are all-ball-bearing and provide a quick return; therefore they run FASTER than others on the same work.

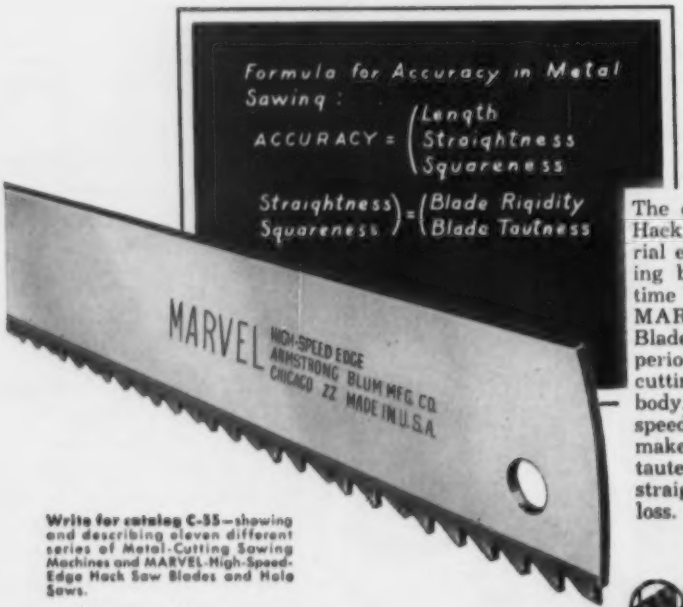
B. Can apply as much as 1200 pounds feed pressure—two to ten times as much as other hack saws and band saws.

C. Are fully automatic, requiring no more operator attention than an automatic screw machine; and set-up for any bar size and cut-off length is extremely simple.

D. Use a non-breakable high speed hack saw blade—the type of saw blade that produces the greatest number of square inches of metal cut per dollar of blade cost—two to ten times (or more) as much as any band saw.

E. Because of their exceptional sturdiness, ball bearing reciprocating frame, ability to tension the blade "truly taut", their accuracy is dependable.

If you are not using modern, improved MARVEL NO. 6A and 9A production hack saws, call the local MARVEL Field Engineer and get his production and cost estimates on your work—to compare with your experience records.


Formula for Accuracy in Metal Sawing:
ACCURACY = (Length, Straightness, Squareness)
(Straightness / Squareness) = (Blade Rigidity, Blade Tautness)
MARVEL
HIGH-SPEED EDGE
ARMSTRONG BLUM MFG. CO.
CHICAGO ZZ MADE IN U.S.A.

Write for catalog C-35—showing and describing eleven different series of Metal-Cutting Sawing Machines and MARVEL-High-Speed-Edge Hack Saw Blades and Hole Saws.

The composite MARVEL High-Speed-Edge Hack Saw Blade—cuts **any** machinable material efficiently. There is no time lost changing blades for different types of steel; no time lost replacing shattered blades, because MARVEL High-Speed-Edge Hack Saw Blades are positively **unbreakable**. These superior blades have the finest high speed steel cutting edge welded to a strong alloy steel body. They will stand-up under the highest speeds and heaviest feeds attainable on any make hack saw. Can be safely tensioned tauter than any other blade—cut-off not only straight but also square and with less stock loss.

Metal Cutting MARVEL SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

MACHINE TOOL HIGH SPOTS

Lease Plan Reaps Multiple Benefits

Kearney & Trecker program grossed $2 million in leases, $3 million in sales during first year . . . Plan builds customers' interest . . . Many inquire about leasing, wind up buying the tools—By *E. J. Egan, Jr.*

◆ A SOUNDLY conceived and intensively promoted machine tool leasing program can bring a reputable machine tool builder a number of direct and indirect benefits. At least that's the experience of Kearney & Trecker Corp., prominent Milwaukee builder of milling machines and special machinery.

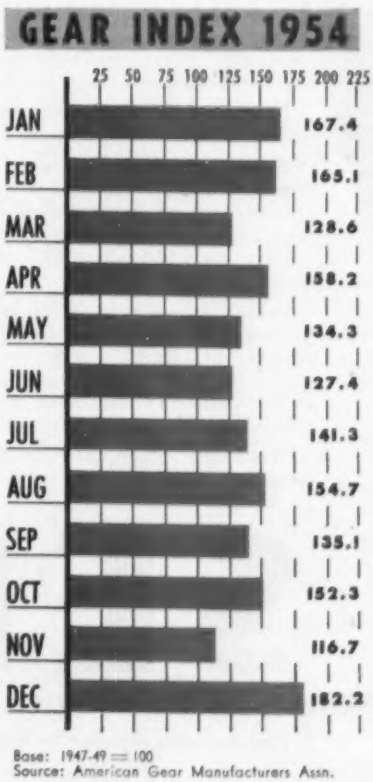
A year ago last month the company climaxed a five-year study of tool leasing, and announced three optional plans to the metalworking industry. K & T has been running with this particular torch ever since, and shows no signs of slowing down.

Results Pleasing . . . When the firm added the results of its first year's experience with tool leasing, it made pleasant reading for all concerned. Totals indicated over $2 million in active lease agreements and better than $3 million in sales. The outright sales were made to customers (many of them new) who investigated the leasing plans, then decided to buy instead.

All told it came to more than $5 million in what is felt to be mostly extra business. And it came out of approximately 3500 inquiries which K & T has received since it launched a rolling barrage of tool lease advertising in January, '53.

Follow Up Inquiries . . . There's a healthy backlog of these inquiries which salesmen are scrambling to slim down. Company officials relish the thought that an untold amount of new business still lurks in this mass of ad coupons and big-firm letterheads. Essential information from all inquiries is transferred to "lead" cards which are sorted by geographical location for quick sales followup.

A number of other machine tool builders followed K & T with leasing plans last year. Some of them claim to have preceded the Milwaukee firm with the idea. But none appear to have promoted the concept with K & T's vigor and enthusiasm. A few have even begun to soft pedal tool leasing, preferring to advocate time payment plans with annual payments geared to new depreciation schedules.



Base: 1947-49 = 100
Source: American Gear Manufacturers Assn.

Sell Top Officers . . . Aside from the business already received, K & T derives another advantage from its consistent promotion of tool leasing as a possible way to acquire new equipment. This is the opportunity afforded the firm's sales representatives to tell their story to top management officials. Inquiry after inquiry coming to the Milwaukee office is signed by a company president, controller, general manager or some other high ranking executive.

This is like giving the salesman an engraved invitation to visit the front office, where the buying decisions are made. It's a welcome change from his years of plugging away at shop visits, hopefully pouring a little water each time on seeds that had been planted long before. Now he can really talk about financial details, emphasizing his story of bigger savings and bigger profits through modernization. And he's doing it successfully in many cases as the record shows.

Reappraise Defense Needs . . . Government officials recently told machine tool builders at a Washington meeting that original recommendations for tool procurement under the Vance Plan must be reappraised in view of new weapons needs. The forecast was not expanded, but it is clear that Office of Defense Mobilization is studying the reappraisal problem now.

Business volume in the gearing industry jumped to an index level of 182.2 in December, 1954, up 56.1 pct from the November figure of 116.7.

MORE PRODUCTION PER SQUARE FOOT OF FLOOR SPACE *THAN ANY OTHER CONTINUOUS UNIT*

Selas Continuous Strip Annealing Furnace Speeds Production . . . Requires Less Space . . . Improves Quality

Brass strip annealed at speeds up to 190 feet per minute, in only 11-foot high vertical heating panel, in a single pass. Total floor space occupied—from payoff to takeup reel—only 13 x 60 feet. Uniform, controlled grain structure produced to exact specifications—plus ability to achieve unique fine grain with improved ductility.

That's the record of this Selas continuous gas-fired annealing furnace at Somers Brass Co., in more than one year of uninterrupted service.

Selas Thermo-Automation—automatic radiant heat processing—opens the way to similar improvements in quality and savings of production time in continuous strip annealing of steel, copper, nickel, aluminum, magnesium and many alloys. Even tin reflow lends itself to Selas heat processing with startling results in increased speed and lower costs.

Selas Thermo-Automation is the key to improved efficiency wherever you use heat for processing. In heat treating, brazing, forging—and other operations involving both ferrous and non-ferrous metals, let Selas Engineers design heat processing to meet your product requirements.

Write for informative brochures on continuous strip annealing.

SELAS

SELAS

CORPORATION OF AMERICA • PHILADELPHIA 34, PA.

Heat Processing Engineers for Industry • Development • Design • Manufacture

The Iron Age SALUTES

Harold T. Avery

Tinkering with an old calculator in his office sparked this active engineer's curiosity and started an outstanding career marked by an amazing number of "firsts" in calculating machine design.

If there hadn't been an early model calculator in the office of the California Div. of Highways back in the early '20s, Harold Avery, vice-president engineering, Marchant Calculators, Inc., might never have become one of America's foremost calculating machine designers.

Harold's early tinkering, sparked by a desire to perfect that pioneer machine, led him to a brilliant career, and the invention and development of dozens of different calculators. He now holds 62 U. S. patents relating to calculating machinery.

In 1933, a few short years after he joined Marchant as chief engineer, he developed the firm's "Silent Speed" calculator which embodied the entirely new principal of proportional gears which resulted in multiplication speed three times greater than before and division speed two-and-one-half times greater.

Far from an "all-work-and-no-play" type of engineer, Harold feels that lack of recreation lowers personal efficiency, backs his belief with an unusually wide range of extra-curricular activities. On vacation trips he engages in color photography.

Swimming has been the motivation for his membership in an Oakland's Athens Athletic Club, and trips he and Mrs. Avery made to Hawaii. Active participation in folk dancing, plus a recent interest in gardening fill his other free moments.

From the time Harold got his engineering degree at Stanford in 1915 'till 1929 when he joined Marchant, he worked for the California Highway Div. except during World War I when he served as a Captain with the Engineers.

Harold has also invented aeronautical and navigational devices including the latitude and longitude meter on which the Arma dead reconing indicator is based. He has also registered 12 patents on helicopter controls.

Activities in industrial organizations and community affairs are not neglected by Harold, who has chaired the San Francisco Engineering Council, been a director of the Oakland "Y," and is trustee of the Pacific School of Religion in Berkeley.

SPEED CASTING
OPERATIONS
WITH THIS
THERMAL
LADLE HEATING
BURNER

MANY COST-SAVING APPLICATIONS...

The extreme high heat release rate of the THERMAL burner makes possible the application of this ladle heating installation without altering your existing facilities or production methods.

1. Reduces ladle pre-heating time as much as 75%.

2. Maintains pouring temperatures during continuous casting operations.

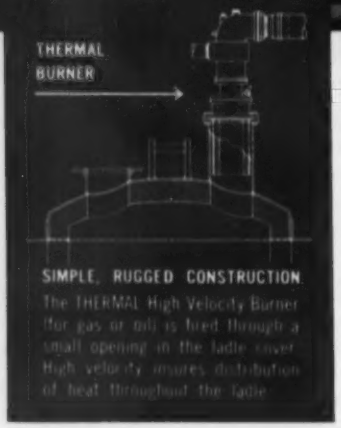
3. Can pre-heat or even melt-down a charge within the ladle.

4. Atmosphere can be controlled as needed.

5. High velocity can actually stir the molten metal.

QUICK, ECONOMICAL INSTALLATION...

THERMAL ladle heating installations are available complete with ladle covers or ready for mounting to your present cover. All necessary valves, blower, pump, etc., are supplied for immediate application.



SIMPLE, RUGGED CONSTRUCTION

The THERMAL High Velocity Burner (for gas or oil) is fired through a small opening in the ladle cover. High velocity insures distribution of heat throughout the ladle.

OTHER THERMAL PRODUCTS & SERVICES

Gas, Oil & Combination Gas-Oil Burners • Heat Exchangers • Air Heaters • Submerged Combustion • Combustion & Heat Transfer Engineering

THERMAL

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA

The Iron Age INTRODUCES

L. A. ESTES, elected president, Dodge Steel Co.

Revis L. Stephenson, vice-president, elected a director, **United States Hoffman Machinery Corp.,** New York.

James Boyd, appointed vice-president-Exploration, **Kennecott Copper Corp.**

Roger E. Bremer, elected a vice-president, **Studebaker - Packard Corp.** and will be responsible for product planning and programming.

William M. Stark, elected commercial vice-president, **Federal Electric Co.,** Newark, N. J.

Barry B. Willis, promoted to executive vice-president and general manager, **Pastushin Aviation Corp.,** Los Angeles.

Norman W. Rowand, named assistant to the vice-president, **Rockwell Mfg. Co.; Paul A. Mankin,** named general manager; and **Arthur W. Krause,** named factory manager.

J. F. VanCleave, appointed assistant to the vice-president in charge, **Detroit Steel Corp.,** Detroit; and **F. E. Weise, Jr.,** appointed assistant to the general superintendent; and **A. E. Albrecht,** promoted to superintendent in charge of the blooming, bar and hot rolled strip mills.

Robert G. Hess, appointed vice-president-Operations, Pesco Products Div., **Borg-Warner Corp.,** Bedford, O.

Ernest H. Bellard, appointed vice-president in charge sales, **The Swartwout Co.,** Cleveland and **William H. Krueger,** becomes treasurer and controller.

George L. McKenna, elected vice-president in charge of sales, **Toledo Scale Co.,** Toledo, Ohio.

Lloyd V. Guild, elected vice-president in charge of research and product development, **Burrell Corp.**

Archie K. Beard, appointed manager, Metal Processing Div., and eastern divisional manager, New Chem-Mill Div., **Turco Products, Inc.,** Los Angeles.

John C. Madden, appointed assistant district manager, Spang-Chalfant Div., **The National Supply Co.**

Donald A. Permoda, promoted to advertising manager, Tool & Machine Div., **Illinois Tool Works;** and **R. Douglas Toler,** promoted to advertising manager, Shakeproof Div.

George Bennethum, appointed assistant manager of tool steel sales, **The Carpenter Steel Co.,** Reading, Pa.

J. Milton Wells, appointed manager, Detroit office, **The Motch & Merryweather Machinery Co.,** Cleveland.

Roland W. Bartlett, promoted to manager, **Worthington Corp.,** Detroit district office.

Everett A. Sisson, promoted to sales manager, Brush Div., **The Osborn Mfg. Co.**

Arnold Challman, named administrative assistant to manager, Chicago offices, **Minneapolis-Honeywell Regulator Co.; R. C. Ferguson,** becomes manager, Peoria branch office; and **R. R. Scott,** is manager of the Davenport office.

W. C. HALE, JR., elected executive vice-president, Dodge Steel Co.

CHARLES B. LANSING, elected president, The Motch & Merryweather Machinery Co.

E. V. DOWDEN, named a vice-president, Osborn Mfg. Co.

D. T. Bixby, named sales manager, Standard Products Div., Trenton, N. J. headquarters, **De Laval Steam Turbine Co.**

John H. Wall, general manager, home appliance division, elected a vice-president, **Servel, Inc.**

Clayton K. Baer, appointed assistant to the manager, Tool Steel Sales, Div., **Crucible Steel Co. of America,** Syracuse.

Charles H. Boyd, Jr., appointed assistant sales manager, Birmingham, Ala. office, **Universal Atlas Cement Co.,** New York.

Albert P. Gagnebin, appointed assistant manager, Nickel Sales Dept., **The International Nickel Co., Inc.**; and **Keith D. Millis,** placed in charge of Ductile Iron Section, Development and Research Div.

Wallace E. Anderson, named general sales manager, **Brown & Sharpe Mfg. Co.**

Maxwell Kennedy, appointed assistant to the sales manager, **Westinghouse Electric Corp.**; and **David C. Fulton,** appointed manager of marine sales for the steam division.

W. M. Martin, becomes manager, **Ceco Steel Products Corp.**; **N. H. Bell** and **E. L. Rohrbach,** appointed assistant manager, architectural window department.

P. A. Burns, appointed manager of sales, **Hewitt-Robins Inc.,** conveyor machinery manufacturing plant, Passaic, N. J.; and **A. J. Ball,** becomes manager, Cleveland district.

John R. Titlow, appointed manager of sales, **Lamson Mobilift Corp.,** Portland, Ore.

Harry E. Ladwig, named foundry consultant, **Allis-Chalmers Mfg. Co.**; and **Anthony Lebesch,** becomes works manager, West Allis Works Foundries and pattern shops.

GEORGE E. BOWDOIN, becomes assistant to the president, U. S. Hoffman Machinery Corp.

ROBERT S. McNAMARA, elected vice-president, Ford Motor Co., Dearborn.

EDWIN H. WEBSTER, promoted to vice-president-production and purchasing, Lurie Engineering Co., Bethlehem.

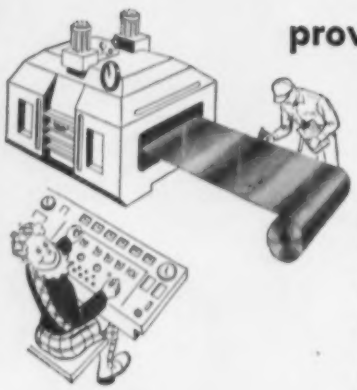
GEORGE E. MERRYWEATHER, elected chairman of the board and secretary, The Motch & Merryweather Machinery Co.

MicroRold® Stainless Steel

"Thinness Control"

provides strip *Quality* in SHEET *Sizes*

Remarkable uniformity of gauge in MicroRold Stainless Sheets up to 36" wide.



The "Thinness Control" used in the manufacture of light gauge MicroRold Stainless Sheets assures you of the *same* dimensional accuracy as in strip stainless. Specified gauge thicknesses may be rolled in sheet sizes with tolerances as low as 3% average (plus or minus) as compared to the A.I.S.I. allowable of plus or minus 10%. This results not only in weight savings but also in fabricating economies.

Regular use of MicroRold Sheet can give you more stainless area per ton or the equivalent area with lesser weight.

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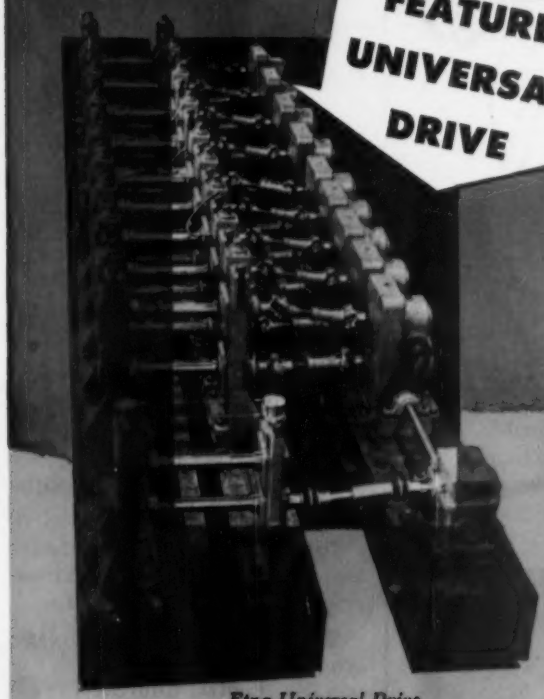

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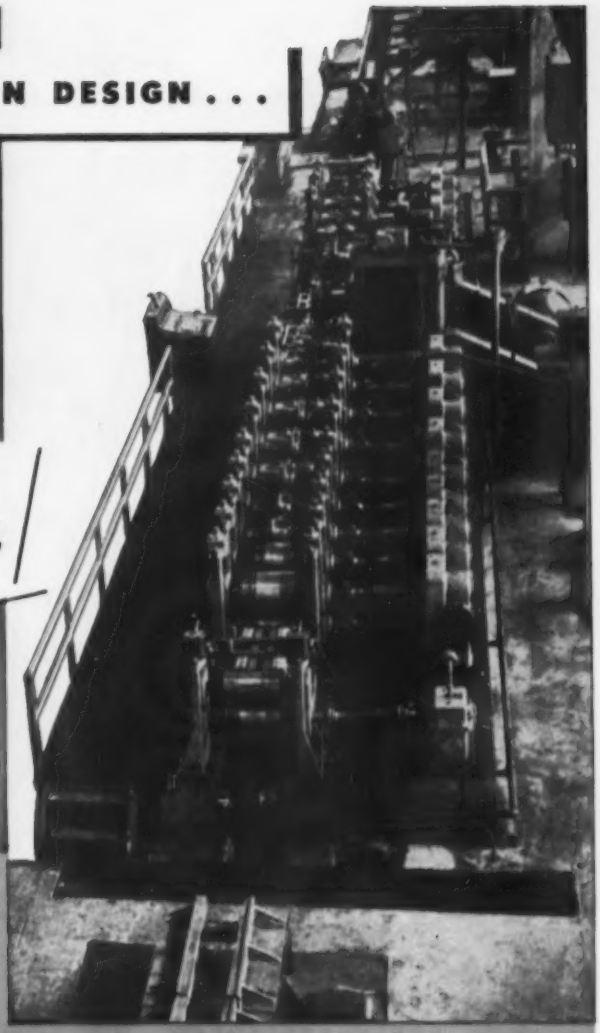

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Lawrence A. Franks, promoted to purchasing agent, **Reed-Prentice Corp., Worcester;** and **Lebbeus S. Case,** becomes production planning manager.

James W. Tysse, appointed manger of safety, **Republic Steel Corp.,** Cleveland.

P. F. Mitchell, appointed purchasing agent, **The Elwell-Parker Electric Co.,** Cleveland.

Robert E. Thomas, appointed general sales manager, Triplex Screw Co., division of **The Murray Corp. of America.**

Rolland O. Baum, elected a director **Merritt-Chapman & Scott Corp.;** and **Robert E. Harvey,** also elected a director.

Earl F. Riopelle, promoted to vice-president in charge of research and engineering **Houdaille-Hershey Corp.,** Detroit.

S. P. Osborn, elected assistant comptroller, **Texas Eastern Transmission Corp.,** Shreveport, La.

M. B. Crowley, appointed eastern regional sales manager, Austin Div., **Central Ohio Steel Products Co.,** Galion, O.

Norman N. Breyer, becomes metallurgist, Armor Div., **Continental Foundry & Machine Co.,** East Chicago, Ind.

Thomas M. Owsley, Jr., appointed blast furnace superintendent, **Globe Iron Co.,** Jackson, Ohio plant.

Thomas L. Norton, becomes superintendent of all tooling fabrication, **Temco Aircraft Corp.**

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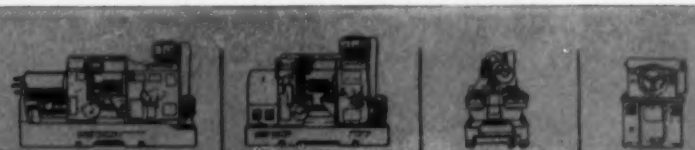

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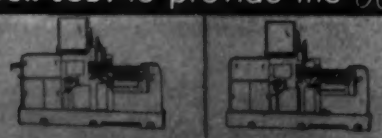

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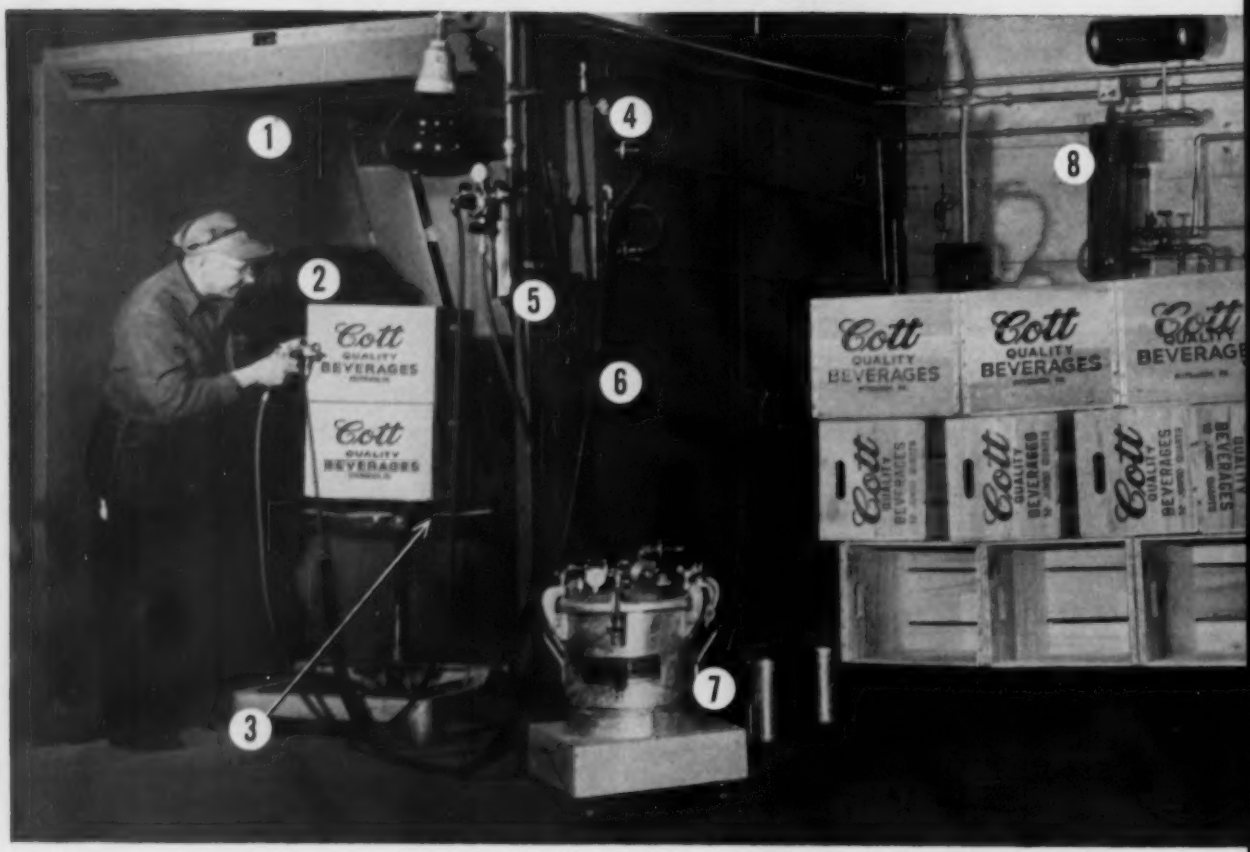

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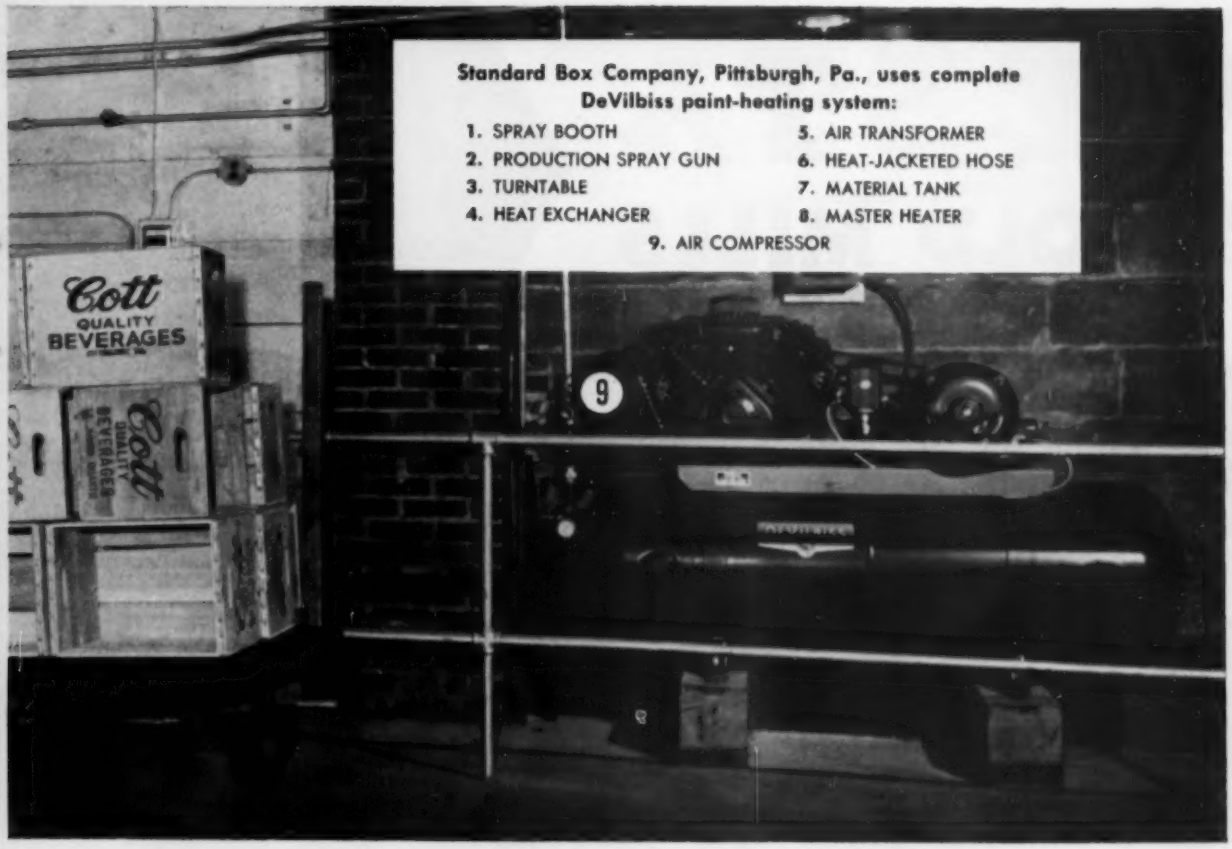

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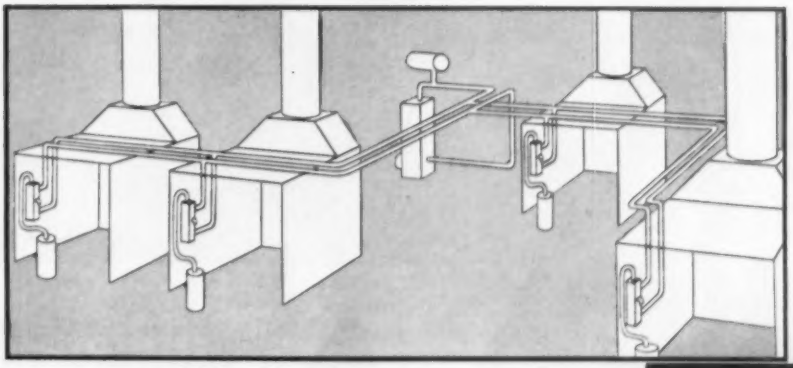

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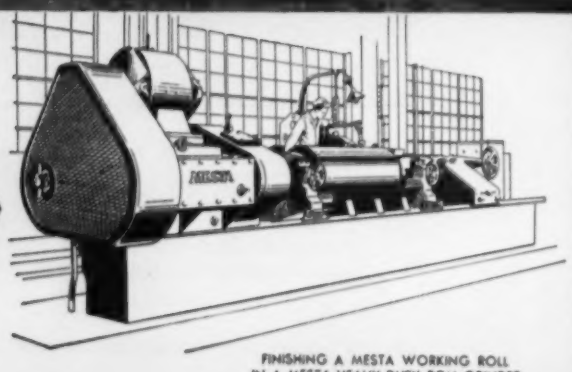

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TECHNICAL ARTICLES

Why titanium galls—

Research Points Way To New Methods of Preventing Galling and Seizing

◆ Galling and seizing of titanium, either in use or in machining and drawing operations have hindered the application and the ability to work the metal . . . Recent research has sought to establish guiding principles which may aid in this problem, both for titanium and for other metals.

◆ Basic data gathered in this study point the way to new methods of protecting metals in sliding contact from seizing and galling . . . Seizing and wear resistance depend on the nature of films formed on bearing surfaces . . . The selection of metal pairs, hardness of the matrix supporting the film are important to metal wear resistance.

Part I

By E. S. MACHLIN, Associate Professor of Metallurgy, Columbia University, New York

◆ GALLING AND SEIZING of surfaces in relative motion occur often enough to make some means of controlling this unwanted welding of surfaces desirable. To study the basic mechanism of galling and seizing, and to obtain more data on the galling and seizing of titanium,[1] a research program supported by the Wright Air Development Center, was set up at Columbia University's School of Mines. Results of this research may yield new methods of protecting metals in contact from seizing.

(1) Seizing and wear resistance depend upon the characteristics of films formed on bearing surfaces.

(2) Protection against seizure and wear is provided by choice of metals comprising the bearing and by nonmetallic films.

(3) Of all metal pairs tested, only Ag-Fe is positively resistant to seizure at room temperature. This pair shows increasing tendency to seize with increasing temperature.

(4) The tendency of solute to adsorb at surfaces may provide the basis of a new way of obtaining seizure and wear-resistant protective films on alloys.

(5) It is important to match the hardness of the matrix supporting the protective film to that of the protective film.

Basically only a few conditions cause galling and seizing. If the two metals in contact have the same hardness, seizing and galling are due to either liquid phase welding or solid phase welding. If one metal is much softer than the other, seizing can also occur by extrusion of the softer metal into the cavities and under the overhangs of the rough, mating hard surface.

Liquid phase welding can be brought about when the surfaces move with respect to each other at high speed and load in the absence of

Part II of Prof. Machlin's article, in next week's issue of The Iron Age, will discuss effects of temperature on galling and seizing. References will appear in Part II.

a friction reducing lubricant. Here the work of friction is high enough to raise the temperature above the melting point.[2] The molten metal solidifies on the cooler parts of the bearing surfaces and causes seizing and/or galling.

Solid phase welding occurs at all times between surfaces in contact.[2] The friction of the contact area which solid phase welds is directly related to the cleanliness of the surfaces. A truly clean surface has the same composition as the bulk metal. It is believed by some that all truly clean surfaces will solid phase weld.[3] Others believe that only metals soluble in each other in the solid state will solid phase weld.[4]

Oxides help prevent contact

Oxides are very helpful in preventing clean contact and solid phase welding. Abrasive particles and smooth surfaces, where lubrication is lacking, lead to galling and seizure. The abrasive particles cut away the protective unclean layer and leave a clean, nascent surface which is very prone to seize. Smoother surfaces promote this action because there are no valleys in which abrasive particles may collect.

The presence of unclean protective layers on the contacting surfaces is the key to anti-seizing and anti-galling behavior. If the unclean layers are wiped away during operation, then the rapidity with which the unclean layer can be reestablished is a factor to be considered in evaluating the galling and seizing resistance of a bearing setup. The resistance of the unclean surface to abrasion or break through is another important factor in determining the galling and seizure resistance of sliding surface.

Friction coefficient measurements on clean surfaces produced by cutting in a cleaned inert atmosphere of argon and measured first in the inert atmosphere and then in air were used to determine inherent seizability or solid phase weldability of metal and alloy pairs. Results are presented in Tables I and II.

The Ag-Fe couple does not solid phase weld to any great extent even when clean, if the tem-

How Titanium Is Affected

◆ Titanium's exceptional tendency to seize and gall is largely responsible for difficulties encountered in machining and wire drawing the metal. A principal reason for titanium's behavior: The normal protective atmospheric film is not formed on the metal's surface at room temperature. A protective oxide film can be formed on titanium by immersion in hydrogen peroxide or by heating in oxygen above about 800°C.

Friction coefficients of various metals on titanium, Table I, do not decrease on exposure of the clean titanium to air but remain high. It appeared this may have been due to the absence of an atmospheric formed protective film on the titanium. This was checked by oxidation of the titanium at elevated temperature and subsequent friction coefficient, Table I, was thereby much reduced.

The concept of a lack of formation of an oxide film at room temperature on titanium seemed strange inasmuch as titanium has a high free energy of oxide formation. One explanation: The rate of oxide formation may be limited by the rate of decomposition of the O_2 molecule into nascent oxygen at the titanium surface. To check this[6] a freshly cleaned titanium surface was placed in 30 pct strength hydrogen peroxide for 15 minutes. A blue oxide formed on the surface. The specimen showed a coefficient of friction of 0.30 as compared to 0.65 for the clean titanium. A control specimen immersed in water for a similar time showed no similar decrease in friction coefficient.

A practical means of providing a protective film on titanium is to immerse the titanium in high-strength hydrogen peroxide or some other solution that will provide nascent (atomic) oxygen to the titanium surface to be protected! This technique eliminates trouble due to galling and seizing in drawing operations.

One by-product of this research was a group of measurements on the friction coefficients of titanium containing various amounts of oxygen and nitrogen in solution. The friction coefficient decreased markedly with increasing oxygen and/or nitrogen content until it equalled that on the oxide or nitride.[5] The values of oxygen and nitrogen content at which this occurred were 0.8 and 0.5 weight per cent respectively.

This effect of oxygen and nitrogen is not due to hardening resulting from the oxygen and nitrogen in the titanium but rather to its ability to induce a surface compound to form even at these values of concentration which are low relative to the respective solubility limits. (See Table IV.)

TABLE IV — **Friction Coefficients of Metals on Titanium**

Metal	Clean	On Titanium Containing 0.8 Pct Oxygen in Solution
Cu	1.14*	0.40*
Fe	0.73	0.48
Cd	0.75	0.40
Zn	0.67	0.30
Al	0.72	0.47
Mg	0.70	0.56

* Independent of hardness of the rider.

perature is maintained at or below room temperature. Thus, there exists at least one exception to the rule that all clean metals must solid phase weld. Perhaps there are more.

The data disprove the suggestion that only mutually soluble metals will solid phase weld and vice versa. Components of the Pb-Cu couple, mutually insoluble in the solid state, solid phase weld exceedingly well.

An attempt was made to arrive at a theory[5, 6] by which it would be possible to predict the cold seizability of metals. As a result a correlation was predicted between solid phase weldability and the ratio between the work of adhesion and the work of cohesion. The work of adhesion is the difference between the sum of the surface energies of the components per unit area and the energy of unit area of an interface between the two components. The work of cohesion is the same type term except the two components are made from the metal or alloy.

The work of cohesion used in the ratio is the smaller of the two possible. A comparison between solid phase weldability and this ratio is presented in Table III. Agreement is quite good except for the Ag-Fe case. This result is a consequence of the fact that solid phase weldability was determined at room temperature, but the work of adhesion was measured at about 1000°C.

TABLE III

Solid Phase Weldability*

Couples	Temperature Deg C	Work of Adhesion Minus Spreading Coefficient ergs/cm²	Work of Cohesion ergs/cm²	Solid Phase Weldability
Ag on Fe	1000	1500 ± 100 (H_2)	1760 (Ag)	Complete at high temperature
Pb on Fe	400	130 (H_2)	630 (Pb)	Limited to Partial at 25°C
Ag on Ti	1000	148 (H_2)	1780 (Ag)	Partial at 25°C
Pb on Ti	400	290 ± 50 (Argon)	630 (Pb)	Partial at 25°C
Cd on Ag	370	1160 (H_2)	1216 (Cd)	Complete at 25°C
Al on Ti	750	450 (Argon)	1300 (Al)	Partial at 25°C
Pb on Cu	400	1765	630 (Pb)	Complete
Ag on Cu	1000	2330	1780 (Ag)	Complete
Cu on Fe	1100	2675	2260 (Cu)	Complete
Cu on SiO_2	1100	325	2260 (Cu)	Limited

* Correlation of relative values of work of adhesion minus spreading coefficient and work of cohesion with solid phase weldability.

TABLE I

Values of Friction Coefficients (Maximum) on Surfaces Formed in Argon, Tested in Argon and Then in Air*

RIDER	SLIDER Fe	Ti (Com.)	Zr (Com.)	Cu	Ag	Ti (Iodide)	Mg	Cd	Al	Zn	Ni	RIDER
Pb	0.80 ± 0.20 0.80 ± 0.20	0.70 0.60/0.70	0.60 0.75	1.25 ± 0.15 0.85	1.25 ± 0.20 0.85		0.55 0.55		0.95 0.95			Pb
Cu (soft)	0.90 0.60	0.60 0.60	0.90 0.65									Cu (soft)
Cu (hard)	0.70-0.90 0.65/0.40	0.65 0.60/0.40	0.60 0.50	1.65 0.70	0.70 0.30	1.15 0.70 ± 0.10						Cu (hard)
Zn	0.65 0.60	0.75 0.65	0.85 0.60	0.90 0.55	0.75 0.45	0.65 0.60/0.35	0.70 0.70		0.55 0.40	0.70 ± 0.10 0.60 ± 0.20		Zn
Mg	0.55 0.55	0.70 0.65/0.55		0.75 0.75	0.60 0.50	0.75 0.50	0.60 0.55	0.65 0.45	0.75 0.60			Mg
Cd	0.70 0.60	0.75 0.70	0.55 0.50	0.65 0.75	0.75 0.50	0.75 0.65						Cd
Al	0.60 0.45	0.70-0.85 0.65	0.55 0.50/0.30	0.90 0.45/0.30	1.00 0.55	0.70 0.45			0.55 0.70		0.60 0.40	Al
Ag (soft)	0.80 0.60			0.60-0.95 0.40				0.70 0.65				Ag (soft)
Ag (hard)	0.90 0.45/0.35	0.65 0.55/0.30	0.45 0.45	0.75 0.30	2.45 1.15	0.60 ± 0.10 0.55						Ag (hard)
Fe	0.70 0.55	0.70 0.65	0.70 0.55		0.45 0.45	0.75 0.65						Fe
Ti			0.70 0.55									
Bi	0.75 0.50	0.65 0.45		0.65 0.30								
Zr			0.65 0.60									

* The top value is the value for clean freshly formed surfaces. The bottom value is on the same surfaces after exposure to air. The right bottom value is on oxidized surfaces of the rider, slider or both. Values to ± 0.05 except as shown.

TABLE II

Room Temperature Weldability of Dissimilar Metals

COMPLETELY WELDABLE

Pb-Cu	Cu-Fe
Cu-(Iodide Ti)	Mg-Cd
Zn-Cu	Mg-Al
Zn-Zr	Mg-Cu
Cd-Cu	Mg-Ti
Al-Ag	Cd-Ag
Al-Cu	Cd-Ti

PARTIALLY WELDABLE ($\alpha = \frac{\text{ns}}{\text{ns}} = \frac{1}{2}$)

Cu-(Com.) Ti	Fe-Zr
Cu-(Com.) Zn	Bi-Fe
Cu-Ag	Ag-Ti
Zn-Fe	Pb-Al
Zn-Ti	Zn-Al
Zn-Ag	Mg-Ag
Cd-Fe	Al-Zr
Al-Fe	Al-Ni
Al-Ti*	Bi-Ti
Ag-Cu	Bi-Cu
Fe-Ti	Pb-Ti

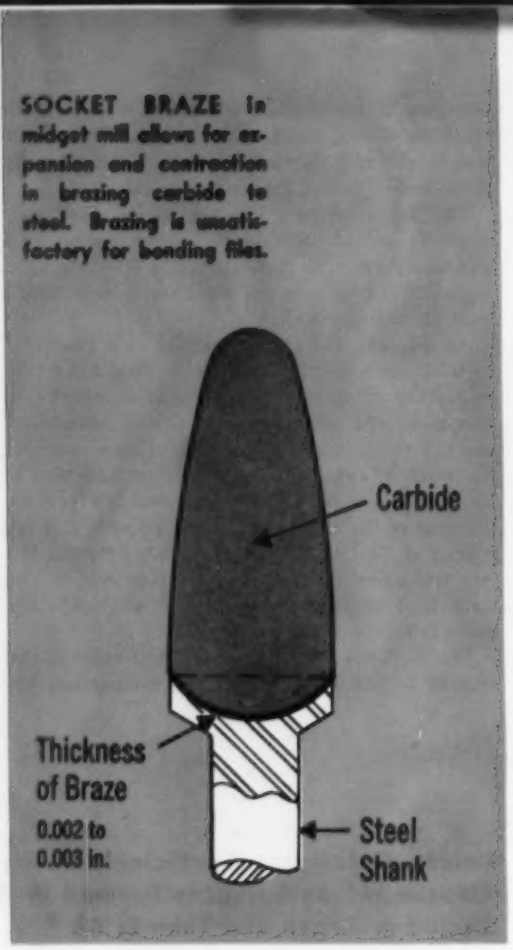
WELDABILITY LIMITED

Ag-Zr	Mg-Fe**
Pb-Fe**	Cd-Zr**
Ag-Fe	

* May belong in top group.
** May belong in partial weldability group.

Short curing cycle—

RUBBER-BASE ADHESIVE Overcomes Tough Carbide Bonding Problem



SOCKET BRAZE in midget mill allows for expansion and contraction in brazing carbide to steel. Brazing is unsatisfactory for bonding files.

By B. L. Schrader,
Research and Development Engineer,
Severance Tool Industries, Inc.,
Saginaw, Mich.

◆ Finding a suitable process or material for bonding carbide files to their backings presented a major problem . . . Brazing was out of the question because of differences in coefficients of expansion and contraction of carbide and steel.

◆ A rubber-base adhesive provided the answer . . . Designated EC-1022, it not only meets all strength requirements, but has a simple and short curing cycle . . . Bonding takes place when files are held at 425°F for 18 minutes.

◆ A MAJOR PROBLEM arising from the use of carbide in the cutting tool industry is that of finding a suitable method of bonding the carbide to other metals. Due to its low coefficient of expansion, it does not adapt itself readily to bonding methods, such as brazing, which require intensive heat. This does not imply that brazing is an undesirable method of bonding, but on carbide, it usually presents certain complications.

Brazing carbide tips to steel shanks is commonplace in the cutting tool industry. But at the same time, the success of this type of bonding is entirely dependent on good engineering and recognition of the basic properties of carbide.

Care must be exercised to control the expansion and contraction of the carbide and the metal to which it is being bonded during any curing cycle requiring temperatures in excess of 500°F. The contraction and expansion ratio of steel to carbide is about 2:1.

If these two materials are joined together at a certain temperature, and it is maintained, there is no possibility of stress or strain being set up in the materials. However, as soon as a temperature change takes place, the steel ex-

FIRST STEP in bonding operation is to assemble and clean file backing and carbide segments.

pands or contracts twice the distance of the carbide. This action sets up stresses and strains within the two materials resulting in distortion and pressures which, if not properly reckoned with, will eventually cause fracture of the carbide and failure of the tool.

These undesirable characteristics of carbide will consistently plague the tool manufacturer with a high percentage of carbide tool failures unless the bonding method eliminates the possibility of the two physical forces from opposing each other.

Studs used previously

In making carbide midget mills, Severance Tool Industries, Inc., Saginaw, Mich., joins carbide tips to steel shanks by using a process known as the socket braze. The steel shank grips the carbide in a manner similar to a hand gripping a baseball. Using this principle, it is highly improbable that fractures of the carbide will occur. The brazed joint has been specifically designed to allow freedom of expansion and contraction without conflict between the two opposing metals.

Although the idea of the socket braze has been applied successfully to many carbide tools, it cannot be employed in some tool applications. One instance is in the manufacture of carbide hand files.

The general method previously used to bond carbide file segments to a metal backing was to braze a stud on the back of the segment, then bolt it to a steel backing. This backing, because of the principle involved, was quite large. Due to this abnormal size, compared with an ordinary steel file, it was not as versatile as its thin steel counterpart.

In jobs where these carbide files did find use, they performed exceptionally well. Severance, therefore, set up an experimental program in search of a better file design. The biggest problem arising from this redesigning program was that of reducing the size of the file backing so that the overall file size would be comparable to that of an ordinary steel file.

Brazing the carbide file segments directly onto the steel backings would seem the most logical approach. However, experience with brazing revealed certain undesirable characteristics of carbide. One particular problem was created by the carbide constantly warping out of shape upon

ADHESIVE is applied in thin, even coat on surfaces to be bonded. Before curing, it is air dried to tacky stage for 2 to 5 minutes.

cooling. Although every precaution was taken, the warpage could not be eliminated. Even when a small stud was brazed to a carbide segment, a great deal of warping occurred. Brazing on the new file design was out of the question. This decision made the problem even more complex since there was no known acceptable method for bonding carbide to other metals prior to this time.

The field of adhesives offered some promise of a solution. Certain adhesives provided bonding strengths in the range needed for the files. About 30 different adhesives were obtained for test purposes with the objective of obtaining one which would fit the following qualifications:

Best possible adhesive strength.

Retention of its strength below 300°F.

Simple and short curing cycle, easily adaptable to production.

Among the first adhesives to be tried were the synthetic thermosetting resins. These proved unsatisfactory because they had too sharp a breaking point, indicating that the bond would not be able to withstand the required degree of shock. Other adhesives were rejected because their curing cycle or loss of adherence occurred at a temperature below 300°F.

New adhesive meets requirements

After long experimentation, an adhesive was found. It carried the designation EC-1022 and was manufactured by Minnesota Mining & Mfg. Co. Being a rubber-base adhesive, it allowed some "give" in the area of the bond. Although this allowance was extremely limited, it provided enough flexibility to prevent formation of a bond with a sharp breaking point.

The bond can be subjected to a large degree of shock or rough handling without breaking. In most cases the carbide fractured before the adhesive lost its strength when the test part was subjected to excessive shock.

This adhesive fulfilled two objectives. First, it met all strength requirements. Secondly, its curing temperature was 425°F, which was far in excess of the 300°F minimum. Furthermore, it provided the shortest curing cycle of any adhesive tested.

Curing time and temperature were determined entirely from the size of the bonding area. For carbide file segments, the bonding area was 4.5 sq in. The best bond occurred at a temperature of 425°F after an elapsed time of 18 minutes. Variation from this schedule of more than one minute one way or the other resulted in a poor bond. A variation in temperature of more than ±10°F also had detrimental effects on the bonding strength.

In bonding, the carbide file had to be secured in a jig or clamp under pressure. To determine the time required for good bonding, allowance had to be made for the transfer of heat through the mating parts as well as the jigs or clamps to achieve intimate contact of the parts.

The first step in the bonding operations is the assembly of the file backings and carbide segments, at which time the parts are carefully checked for cleanliness. The EC-1022 adhesive is then applied in a thin, uniform coat on the surfaces to be bonded.

The adhesive is then air-dried to the tacky stage so that it will adhere, but not transfer, to the finger when touched lightly. This open time is only 2 to 5 minutes, after which the surfaces to be bonded are pressed firmly together in a specially designed jig.

Backing plated chemically

The files are then placed in a thermostatically-controlled oven at 425°F for 18 minutes. At the end of this cycle, the files are air-cooled to room temperature while remaining in the jigs under pressure. This practice avoids the possibility of warping. Excessive bonding material is removed from the files by a wire buffing wheel before final grinding.

After grinding, the files are chrome plated. The file backing is made of Dowmetal, permitting the chrome plate to be applied chemically rather than electrolytically. Plating takes about four minutes, is very economical and does not interfere or attack the bonding material or the carbide segments. The plated surface has an exceptionally bright finish which is highly wear resistant.

From an economic as well as a practical standpoint, it is feasible to make the file from two pieces of carbide rather than one. Producers of carbide cannot extrude blanks of required size without serious distortion occurring at the time of extruding or final hardening. Also, cost of the carbide rises sharply as the size of the blank increases.

Needle Rollers Shipped in Vacuum-Sealed Cans

BASKETS of precision-made needle rollers are dumped into hopper for loading into cans.

VACUUM sealing filled cans to eliminate possible damage to parts from corrosion and dirt.

Sealed, labeled cans arrive in shipping department. Vacuum pressure in cans is 28 in.

CANS of needle rollers are shipped in two-carton units strapped to disposable skids.

◆ A UNIQUE packaging method for precision made antifriction needle rollers is now being used by The Torrington Co., Torrington, Conn.

It involves substituting tin-lined steel cans for cotton bags as shipping containers with identification stamped on cover of cans. Benefits to both customer and manufacturer are derived from improved packaging and reduced handling.

Torrington's needle rollers, used in numerous industries, were formerly packaged in cotton bags with stitched-on identifying tags. Precision ground and finished to provide antifriction bearing service, they were coated with a slushing compound before packing.

When received, customers had to clean the rollers, a process both expensive and time-consuming. A second disadvantage was complicated handling procedures. Shifting loads, or improper stacking, sometimes resulted in broken bags and ruined rollers. Finger-prints, dirt, and perspiration also invited corrosion.

Torrington reports that packaging the rollers in vacuum-sealed, food-type, gallon-sized cans gives many advantages. Both preshipment oiling and postshipment degreasing are eliminated. Rollers are delivered in the same condition as when inspected. They may be placed in a product directly from the cans, further reducing the possibility of corrosion. The average can holds 25,000 to 35,000 rollers and vacuum pressure and the can is 28 inches. During shipment rollers are protected from atmospheric conditions, particularly temperature and humidity.

Each carton of cans weighs approximately 1200 lb and is strapped to disposable, skid-mounted pallets. This reduces the possibility of in-transit damage to a minimum, facilitates handling by fork-lift, saves labor.

Reduce operations—

Single Progressive Die Forms and Fastens Terminals to Wire Ends

◆ Brass terminals are formed and fastened to wire ends in a single progressive die setup . . . System supplants use of either swaged and soldered or costly preformed terminal strips . . .

◆ This one-shot forming and fastening method will save IBM's Endicott, N. Y. plant more than $100,000 yearly . . . Progressive dies are mounted on standard crank presses.

By R. F. DRUM, Technical Engineer, Mfg. Research Dept. International Business Machines Corp., Endicott, N. Y.

◆ A SINGLE progressive die not only blanks, pierces and forms wire terminals, but actually fastens them to wire ends as fast as the wires can be placed in the die. This high volume operation at International Business Machines Corp.'s Endicott, N. Y. plant shows marked savings over two former methods; (1) the use of swaged and soldered terminals; (2) the use of barbed terminals bought in performed strips.

Besides achieving the high production rate the new progressive die setup brings an added saving: It is not necessary to skin insulation from wire ends before the terminals are applied. Formerly, this meant a separate operation on each wire in another machine.

Each of the new terminals has sharp prongs in the U-shaped end which fastens to the wire. When the die forms the U-portion around the wire, the prongs pierce the insulation and make permanent contacts with the wire strands. These contacts provide ample current carrying capacity, and the new terminals give excellent service in prolonged use.

Present annual requirements for the new terminals exceed sixty million units. Approximately half of this production will be made on equipment designed by IBM. This will mean a

TERMINAL strip shows progressive forming steps before final wire fastening and shearing-off.

saving of about 0.35 cents each over a barbed terminal formerly purchased in ready-formed strips. Annual saving on this basis alone will exceed $100,000. This does not include the time saved by using the new terminals instead of swaged, welded and soldered types that took longer to apply and required wire skinning.

Before installing the new progressive dies, the company used a separate machine which applied barbed terminals as they were cut from preformed coiled strips. The firm paid for all the prior blanking, piercing, forming and coiling.

Dies mounted in light presses

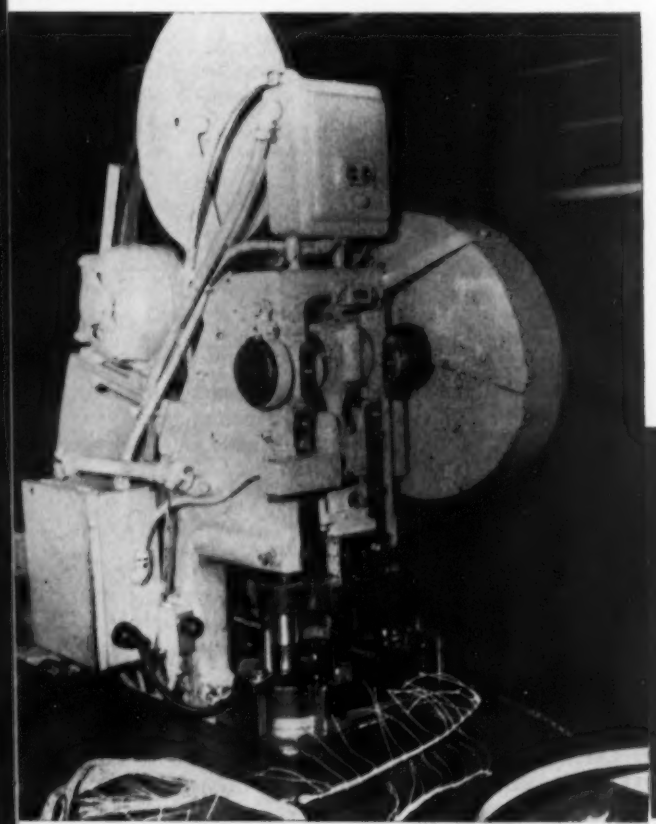
The new dies are mounted in standard light presses and work on less expensive coils of flat brass strip. The strip is blanked, pierced, trimmed, and formed as it passes through the die toward the operator.

As a final operation the insulated wire end is placed in the barbed, U-shaped section of the terminal. The die then closes automatically, forming the U into a sleeve around the wire and forcing the barbs through the insulation into the wire strands. At the same time, the terminal is sheared from the strip. One die and one machine do all the forming, wire fastening and shearing. Application rates often exceed 1,000 terminals an hour.

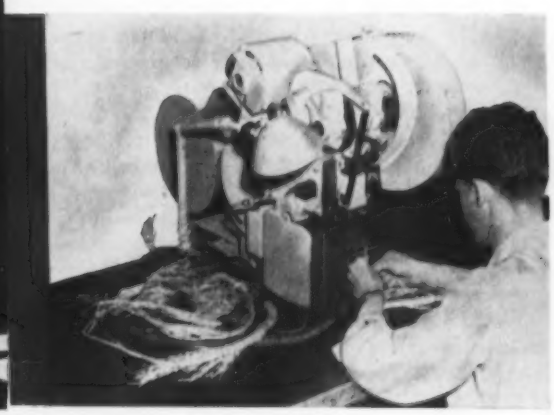
It is not necessary for the operator to trip the press to fasten a terminal to a wire end. Placing the wire in position actuates a micro switch and then a solenoid which strips the press and closes the die. At no time does the operator place his hands or fingers inside the die. Speed of application is as fast as wires can be placed in the die one at a time. Application is readily performed either on the ends of single wires or those that form part of a harness or other assembly.

In a typical production setup, a coil of quarter-hard brass strip 0.0159-in. thick and 5/16-in. wide is fed into the die by a standard Dickerman hitch feed, replacing the roll feed formerly used. Older dies also used an air pad, but this was later replaced by springs.

Seven different designs or sizes of pronged spade, taper or flag-type terminals are presently in production. Although all dies are now used in standard crank presses, other press types could be used. Press power need only be sufficient to work brass strip in a progressive die.



AFTER—
SMALL crank press uses flat brass strip, one progressive die to form and fasten terminals.



BEFORE—
TERMINAL-fastening machine proved value of pronged parts but used costly preformed strips.

How Redesign Boosted Strength of Cast Iron Compressor Cylinder

◆ Compressor cylinder castings used in natural gas transmission service must stand up under continued working pressures of 1200 psig . . . Formerly a border line case where steel castings were generally used, these cylinders may now be produced from high strength cast iron.

◆ Research of all factors affecting the castings' resistance to hydrostatic pressure preceded development of a new cylinder . . . Redesign proved to be the most important factor in boosting compressor cylinder strength.

By T. H. BURKE,
Chief Metallurgist, Worthington Corp., Buffalo

◆ REDESIGN of a high strength cast iron compressor cylinder recently permitted a 40 pct increase in resistance to hydrostatic pressure and yielded a greater factor of safety in service. The redesign was based on extensive research studies by the Buffalo Works of the Worthington Corp. of all factors affecting strength of the compressor cylinder.

Object of the study was to determine the feasibility of supplying high strength cast iron compressor cylinders for natural gas transmission service. This service requires compressor diameters up to 13 in. and working pressure up to 1200 psig. Previously, this service application was considered a border line case and steel castings were generally used.

Tests sought data relative to the hydrostatic pressure required to burst the cylinders and thereby determine whether the margin of safety of cast iron in the performance of these castings would be ample for service conditions imposed.

Test data were found to be closely related to design, foundry procedures in gating and risering, melting practice, the microstructure of the metal, its chemistry and molecular arrangement. The effects of proper heat treatment were also studied. A properly applied stress relief anneal —usually done before machining—can generally remove practically all residual casting stresses in these cylinder castings.

Three castings from the same pattern and core boxes were poured from high strength cast iron of dissimilar chemistry. Each casting, before machining, weighed 6500 lb. The castings were designated A (a high strength iron), B (Meehanite) and C (ductile iron). Chemistry of the castings is compared in Table I.

Castings which were poured with their longitudinal axes vertical. The crank ends were in the cope and the head ends in the drag locations of the molds. The crank end being heavier, afforded an advantageous location for the feeders or risers. Fig. 1 shows the gating and risering used for castings and B and C.

Only one down and one inlet gate was used on casting A and the metal entered the mold through a 2⅓ in. diam down gate terminating at an inlet gate ⅝ x 2½ in. in cross-section. This was located between two valve ports and in front of a bracket 2½ in. thick connecting the jacket with the cylinder member. The bracket was about 8 in. from the drag end of the mold.

Pouring required 2½ minutes, the metal entering the mold at the rate of 43.3 lb per second. The pouring rate is considered optimum for pressure castings of this size.

Risers on casting A were located similarly to those on castings B and C. When the risers were half full, pouring from the gates was arrested and the risers topped off with hot metal and covered with a heavy layer of an anti-piping compound. Molds were allowed to remain undisturbed for 72 hours after pouring to minimize casting stress amongst member sections.

Castings stress relieved

After cleaning, A and B castings were stress relieved to eliminate residual casting stresses. Castings were heated slowly to 300°F at a rate of 50°F per hour and slightly faster from 300°F to 900°F. In this range the heating was regulated in steps of 200°F. At each temperature level, a soaking period of 3 hours was maintained, except at 900°F where a 4-hour period was maintained.

Overall heating and soaking time required 34 hours and 12 hours were expended in cooling from 900°F to 200°F. At this temperature, the castings were removed from the furnace. The 900°F temperature was selected after tests revealed little tensile strength was lost at this temperature when compared with the as-cast

ACKNOWLEDGMENT

The author wishes to thank Mr. Austin C. Ross, Vice President, Buffalo Works, for permission to publish this material.

result using the ASTM 1.2 diam test bars.

The C iron cylinder was heated slowly to 1700°F, soaked at this temperature for 7 hours, then normalized in still air. When the casting cooled to 300°F it was tempered at 1300°F for 15 hours and furnace-cooled. This treatment confers considerable ductility upon the metal while sacrificing only 7 pct in tensile strength. A full anneal would cut tensile strength 30 pct.

After heat treatment, the castings were machined as specified for service and then prepared for the rupture tests. Prior to application of hydrostatic test pressures, a stress coat was given each casting to observe whether, under pressures approximately twice the working pressure, there were indications of weakness in the castings. The usual manifestations of stress concentrations were merely discernible in castings A and B. Because of the physical structure of

FIG. 1—Old design casting showing gates and risers used in pouring Meehanite and ductile iron.

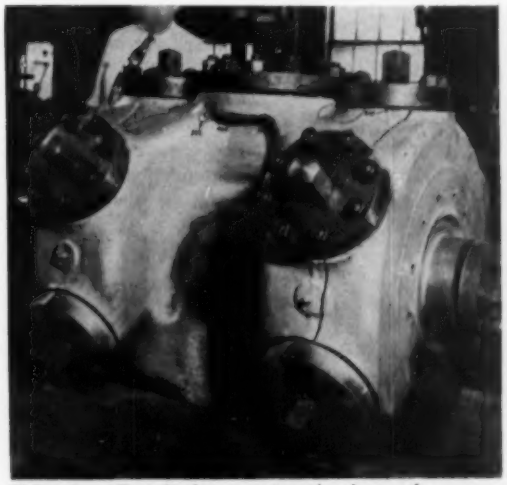


FIG. 2—All cylinders ruptured along the same approximate line, indicating design weakness.

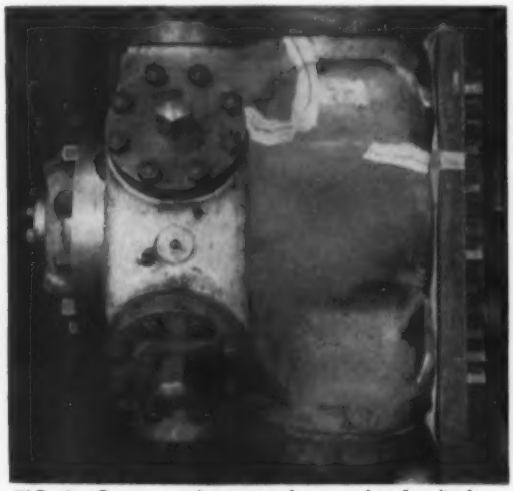


FIG. 3—Setup used to test drag ends of cylinders. Note incipient ruptures. Plate is bolted on.

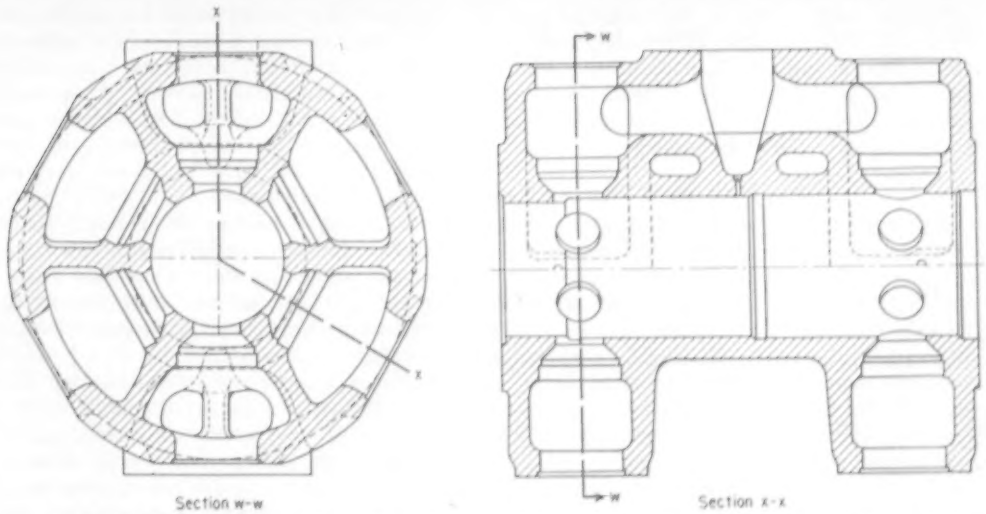


FIG. 4—Redesign of casting eliminated crank head ends as integral part of the cylinder.

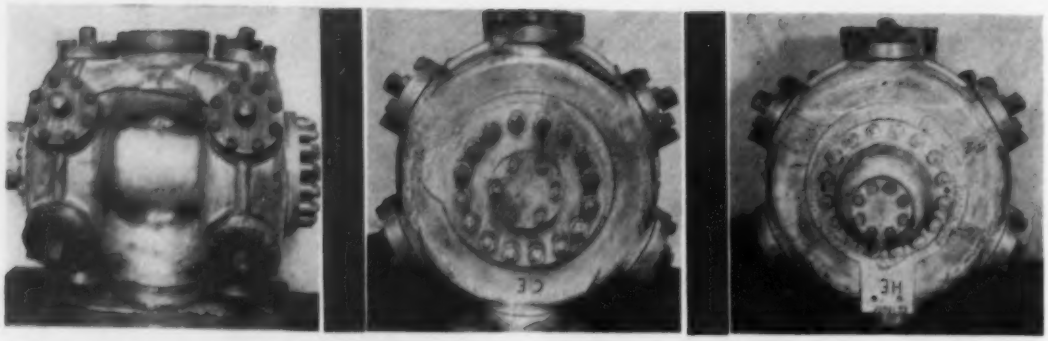


FIG. 5—Rupture lines which developed at 5800 psig hydrostatic pressure in new cylinder.

FIG. 6—Stress lines and fractures in the cope and drag ends of the redesigned casting.

cast iron, the lines of stress are but slightly commutable and therefore were barely registered on the stress coat.

The presence of the flake graphite, from 151 to 165 lb, and its uniform distribution mainly account for the slight indications of stresses on the coatings.

Stress manifestations were somewhat more apparent in the C casting. Here, due to graphite being nodularized, passage of stresses to the coated surfaces encountered less resistance although the graphite concentration was approximately 195 lb.

Cylinders were then tested hydrostatically to destruction. Each displayed similar initial breaks occurring in the cope sections or crank ends. The line of rupture between the valve ports, Fig. 2 extended throughout the entire periphery of the castings.

Consistent locations of breaks indicated some inherent design weakness. The design was later modified by divorcing the crank end head from the casting. This resulted in a 40.0 pct increase in hydrostatic bursting pressure.

To study strength of drag sections, the broken faces of the cylinders were machined off to the horizontal center lines of the castings and a thick steel plate attached. Hydrostatic pressures were applied until rupture occurred. Fig. 3 shows the set up and the incipient ruptures. Table II gives the tests results of the cope and drag sections of the three castings.

How irons measured up

Upon completion of the hydrostatic tests tensile test bars were prepared from corresponding locations in the cope, drag, cylinder wall and valve port of all three cylinders. Table III shows the tensile strength and Brinell hardness results on sections 2½ in. in thickness. The tensile specimens were machined to 0.800 in. diam on center lines coinciding with those of the sectional thickness and in conformity to ASTM specifications for testing cast iron.

A and B irons were similar in tensile and hardness. Average tensile strength in the cope and drag locations of the ductile iron (C) cylinder exceeded those of the A and B cylinders by about 41.8 pct. Ductility of C cylinder specimens was determined on standard 0.505 in. diam x 2 in. gage length from 2½ in. thick sections. Table IV shows test results from standard specimens and from 1 and 3 in. keel bars. These are very good tensile properties for the sections involved. Yield point averages 60 pct of tensile strength.

Results of keel bar tests show yield and tensile strength relationships in the order of 75 pct. The difference in elongation and Brinell between the casting and keel bar results are normal.

Rupture lines were consistent

There were no standard B bars poured with the B cylinder so no correlation could be made with the casting results. Table V shows the correlation in percentage between the casting and test bars, the pouring weights being 7800 lb vs. 40 lb. These results are good and indicate the extent that test bar values may be discounted to arrive at the casting tensile values in this particular test.

Consistent locations of rupture lines in all three castings indicated an inherent design weakness in the cope or crank end of the cylinders. To overcome this, a cylinder was designed without the crank end head cast integral with the cylinder barrel and having ports cast independent of the barrel. Fig. 4 shows horizontal and cross-sections of the redesigned cylinders. Separately cast crank end heads were attached by studs and nuts.

A cylinder casting of revised design was molded and cast vertically with two 8 in. risers on the jacket wall near the cope and where heavy bosses and internal ribs which connect the outside wall with the cylinder barrel afforded good feeding channels for both.

The new design permitted locating the down gate through the barrel core and from it spider inlet gates were located near the cope and drag ends of the casting. The pouring time is practically the same as for the original setup.

The base iron and alloy additions for this casting were the same as for the A casting and

was made up of 65 pct high carbon and alloy steel scrap balanced off with 35 pct high test iron returns, pig iron and alloys of silicon and manganese. Alloying agents were fed into the stream of iron through modern vibrating feeders which deliver them at a uniform and timed rate. This results in homogenizing the structure and composition of the iron.

Finally, the iron received an inoculation treatment with C_2 alloy developed by Sorbo-Mat Process Engineers for refining the iron and breaking down the graphite flake size thereby increasing the strength of the iron. The mold was then poured and this casting received all of the treatments and procedures applied to the original castings.

Fig. 5 shows lines of rupture which developed at 5800 psig hydrostatic pressure. The change in design improved the resistance to bursting pressure by 38 pct over the drag and 75 pct above the cope values obtained in the previous test. Fig. 6 shows stress lines and fractures in the cope and drag ends of the casting.

The separately cast B bar registered 57,000 psi tensile. Correlation between the cope and drag strengths was 80.2 and 82.5 pct respectively, showing the effect of sectional thickness on tensile strength of cast iron of this composition and the extent that separately cast test bars may be discounted.

Studies of all factors, indicated proper design was of more importance to the inherent strength of this casting in resisting hydrostatic preasures than its chemical or structural compositions.

Stresses more evenly distributed

Elimination of the heavy crank end bearing permitted sectional uniformity in this area and in relation to that of the entire casting. Change in the direction of rupture planes indicate more even distribution of stresses from cope to drag locations.

Too many member parts cast integrally result in lower resistance to stresses. Removal of the crank bearing as an integral part of the casting, a design simplification, made the casting approximately 40 pct stronger. This part was cast separately and studded onto the casting.

More efficient feeding

Removal of cored ports from the cylinder barrel, promoted more efficient feeding and contributed to a better casting of more dense metal.

In highly stressed pressure castings, rib or bracket design is important when used to "tie in" member parts. Often these are terminated abruptly at their intersections with only small fillets used to prevent stress concentration. Longer lines starting from the midpoint of the bracket and blending into the sections to be reinforced, yield much stronger unions by eliminating stresses. Undoubtedly castings poured of the other two metals would also be stronger as redesigned than as originally cast.

TABLE I ANALYSES OF HIGH STRENGTH CAST IRONS, PCT

	A	B	C
Total Carbon	3.11	3.34	3.52
Silicon	1.70	1.88	2.21
Manganese	0.83	1.00	0.47
Chromium	0.34	0.15	0.02
Nickel	1.75	0.31	0.98
Molybdenum	0.70	0.07	0.01
Copper	0.23	0.38	0.22
Sulphur	0.056	0.111	0.008
Phosphorous	0.096	0.131	0.044
Magnesium			0.083

TABLE II BURSTING PRESSURES FOR CYLINDERS

Casting	Cope End Pressure, Psi	Drag End Pressure, Psi	Percentage Increase Drag over Cope
A	3600	4700	30.5
B	3500	4600	31.4
C	3600	5300*	47.2

*Due to leakage at gasket joints, and pump capacity, the drag end of the C cylinder would not rupture at 5300 psi. In all probability the rupture pressure would be considerably higher.

TABLE III TENSILE STRENGTH AND HARDNESS COMPARED

Location of test	A Cylinder Tensile Strength, p.s.i.	B Cylinder Tensile Strength, p.s.i.	C Cylinder Tensile Strength, p.s.i.
1. Cope End	44,200	42,600	78,000
2. Cylinder Wall Cope	43,600	44,600	79,800
3. Cope End	44,000	44,200	*34,000
4. Valve Port	40,600	40,600	73,200
5. Cylinder Wall	43,800	43,400	61,400
6. Drag End	49,400	48,100	84,800
7. Cylinder Wall Drag	48,600	49,200	82,000
Average Cope	43,240	43,080	73,100
Average Drag	49,000	48,650	83,400
Brinell Hardness Range	193-212 (5 tests)	197-207 (5 tests)	155-196 (6 tests; 155 on No. 3)

*Flaws not included in average.

TABLE IV PROPERTIES OF C IRON Standard Test Specimens

Locations	Yield Point, psi	Tensile Strength, psi	Pct. Elongation in 2 in.	Brinell Hardness
Cope End	59,800	91,500	7.5	207
Drag End	62,500	93,500	8.5	210
Drag End	61,300	93,000	7.9	210
KEEL BARS				
	Yield Point psi	Tensile Strength psi	Pct. Elongation in 2 in.	Brinell Hardness
1 in. keel bar	49,500	66,000	20	156
3 in. keel bar	50,000	65,500	13	163

TABLE V CASTING AND TEST BAR CORRELATION

General average tensile, cope 43,2400 psi and the "B" bar 56,000 psi
General average tensile drag 49,000 psi

$\frac{43,240}{56,000} \times 100 = 77.2$ Pct and $\frac{49,000}{56,000} \times 100 = 87.5$ Pct

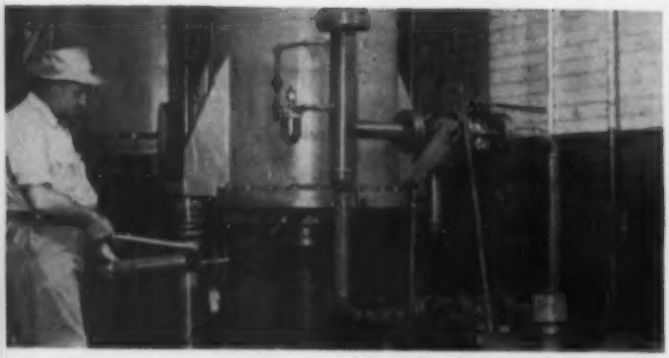
Good "pumpability"—

Multi-Purpose Grease Simplifies Furnace Equipment Lubrication

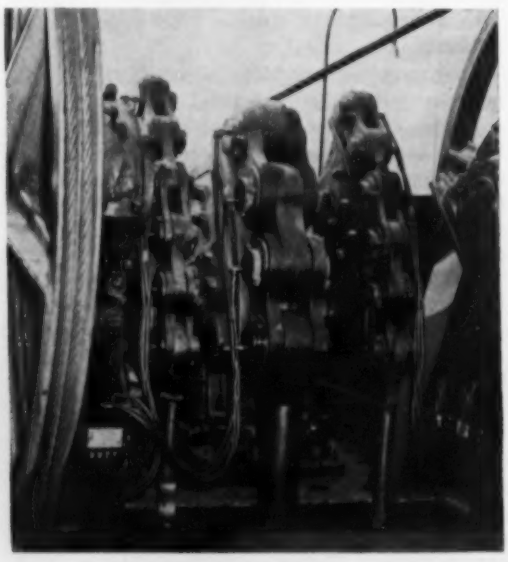
• One of the new lithium-base greases makes blast furnace maintenance easier and cheaper for the Detroit Steel Co. . . . It combines the water and temperature resistance properties of special-purpose types.

• Use of one grease prevents untrained personnel from applying the wrong product . . . Single formula simplifies inventory of grease and lube equipment, helps cut overall maintenance costs per ton of pig iron produced.

By H. B. JENKINS
Chief Lubrication Engineer
Portsmouth Div.
Detroit Steel Co.
Portsmouth, Ohio



AIR-ACTUATED bell operating cylinder gets a shot of lithium-base grease once a month.



MOST sheave lubrication is through automatic lines; a few grease fittings add protection.

TYPICAL LITHIUM GREASE PROPERTIES

(Alvania EP Grease 2)

Color	Dark amber
Texture	Smooth
Soap (kind)	Lithium
Soap (percentage)	7-9
Dropping point ASTM (° F)	360 minimum
Mineral Oil (SUS at 210° F)	75 minimum
Unworked	290
worked 60 strokes	280
worked 180 strokes	280
worked 300 strokes	282
worked 10,000 strokes	295
worked 100,000 strokes	305
Timken OK test	43 lb minimum

◆ LUBRICATING blast furnace and accessory equipment with a new lithium-base, multi-purpose grease, the Detroit Steel Co. has eliminated many maintenance problems and cut overall lubrication costs effectively.

A blast furnace shutdown is so expensive that failures of any sort must be prevented wherever possible. One factor contributing to uninterrupted furnace production is proper lubrication, regularly applied. Detroit Steel makes every effort to keep its lubrication systems simple and fool-proof.

Recently the company lit a new furnace with a daily capacity of around 1400 tons. Designed and built by John Mohr & Sons of Chicago, it incorporates every known refinement, including a fully automatic lubrication system.

The new furnace has almost twice the capacity of the old one. It also has many more lubrication points and requires an average of 650 lb monthly of a more expensive grease. Still the lubrication cost per ton is 20 pct less, due in great part to the all-purpose features of the new lithium-base grease.

One of these features is "pumpability," which is vital in a blast furnace grease and must be maintained regardless of temperature variations.

One problem in pumpability concerns lubricating the skip hoist tub in winter weather. While it is being loaded, practically in the open, the temperature may be as low as —10°F. When loaded it races for the top of the furnace where the temperature usually exceeds 110°F. Despite these sudden and oft-repeated temperature fluctuations, grease in the bearings must function without channeling, separating or hardening. The firm's experience shows that the lithium-base grease meets these severe demands.

When the automatic lubrication system was installed, it was felt that during exceptionally cold weather the grease might have to be heated to maintain its pumpability. Many of the grease lines were enclosed and supplied with steam tracers. But because the new lubricant pumps so well over a wide temperature range, there has been no need to heat the lines.

Cold weather is not the only lubrication hazard; too much heat can also cause trouble. Some grease types the firm tried would begin to carbonize upon exposure to heat. This clogged grease lines and impaired furnace operation. Other lubricants would break down and lose their effectiveness after repeated heating and cooling. But the lithium-based grease has eliminated both of these shortcomings; it functions well at temperatures up to 300°F.

Maintain smaller inventory

The human element in furnace maintenance is also important. Conditions in a steel plant change constantly and a lube foreman finds that he is usually training some new men. He welcomes anything that will make it easier for his oiler crew to do a competent job.

Here again the all-purpose, lithium-type grease is a boon; it can be used wherever there is a grease fitting. Oilers need not be concerned about applying a sodium-base grease (high temperature resistant) when actually a calcium-base product (water resistant) is needed, or vice versa. They simply use the all-purpose grease which is both water and high temperature resistant. This avoids mistakes, and also eliminates extra grease drums, dispensing equipment, and inventory.

Alvania EP grease is used to lubricate the new furnace and all accessory equipment. Fans, blowers, and ore bridge motors are hand-greased once a month. Skip-hoist car wheel bearings, transfer cars, and crane and ore bridge bearings are checked during every 8-hour shift, and grease added if necessary.

Slight pressure buildups

The coke breeze conveyor, furnace sheaves and distributor are automatically lubricated. Every 12 hours, from 0.007 to 0.04 oz of multi-purpose grease is injected into conveyor bearings. Sheaves get 0.04 oz every 3 hours, and each distributor lubrication point receives from 0.02 to 0.04 oz every 2 hours.

Originally, the grease pump was set to generate a system pressure of 800 lb, to make sure the lubricant would be forced through the fairly long lines. But with the excellent pumpability of the lithium-base product it is doubtful if that much pressure ever builds up.

The multi-purpose grease replaced several different lime, calcium, and sodium-base greases as well as some special high temperature lubricants. The new grease was simply pumped into the system to purge the old lubricants out of the bearings. No incompatibility was noted.

A better flow pattern—

New Plant Features FLEXIBILITY, GOOD HANDLING

BETTER USE OF WORK areas, improved flexibility of equipment and facilities were attained.

◆ LAYOUT of machinery and production space in Clark Equipment Co.'s new Benton Harbor, Mich., plant is based on two specific requirements: the need for extreme flexibility in the utilization of work space and equipment, and a flow pattern consistent with maximum materials handling efficiency.

Selection and placement of machinery and apportionment of aisles and work areas were executed to provide ample space for the operations required in the fabrication and assembly of the big, heavy Michigan tractor shovels and excavator cranes.

Submerged arc beam welders used

The three main operations performed in the plant are machining and forming of raw steel into main components; welding and sub-assembly; and final assembly. Some 50,000 sq ft are devoted to fabricating and welding, about 70,000 sq ft are used for final assembly, and 30,000 sq ft are given to storage areas and shipping and receiving facilities.

All sub-assembly welding is done in an area immediately adjacent to the fabrication area. Large pieces are moved from one area to the other by cranes, while smaller pieces are palletized and moved by fork trucks and straddle carriers. Welding is done on twenty 500 amp transformers, 12 motor generator sets and two submerged arc beam welders. A specially made Morton welding machine is used to weld side plates to turntable castings for excavator cranes. All welding is done in fixtures to assure accuracy and reduce time.

Welding operations are divided into primary welding and final welding. Layout of equipment and assignment of work is such that materials flow through the welding department at a smooth, steady pace. At the final welding stage, frames, buckets, bucket carriers, booms and guide bars are completed for assembly.

One of the cutting and welding bays shown in the photo above illustrates how parts required for use on the several assembly lines are stored in the center of the plant, en route from the primary fabrication areas to the assembly departments. The Austin Co., which designed and built the plant, provided 25-ft clearance throughout the manufacturing areas, 80 pct of which is served by overhead bridge cranes like that in the background, left.

The handling of heavy steel plate and equipment from the main distribution aisle to this and other processing areas is accomplished with the aid of travelling beams like that in the foreground. It is suspended from a structure which in turn hangs from the "free-loading" welded H-section trusses used throughout the plant.

Note the different lighting intensities in the stock area on the right and in the production bay on the left. Requirements have been met by various combinations of Mercury vapor and incandescent lamps.

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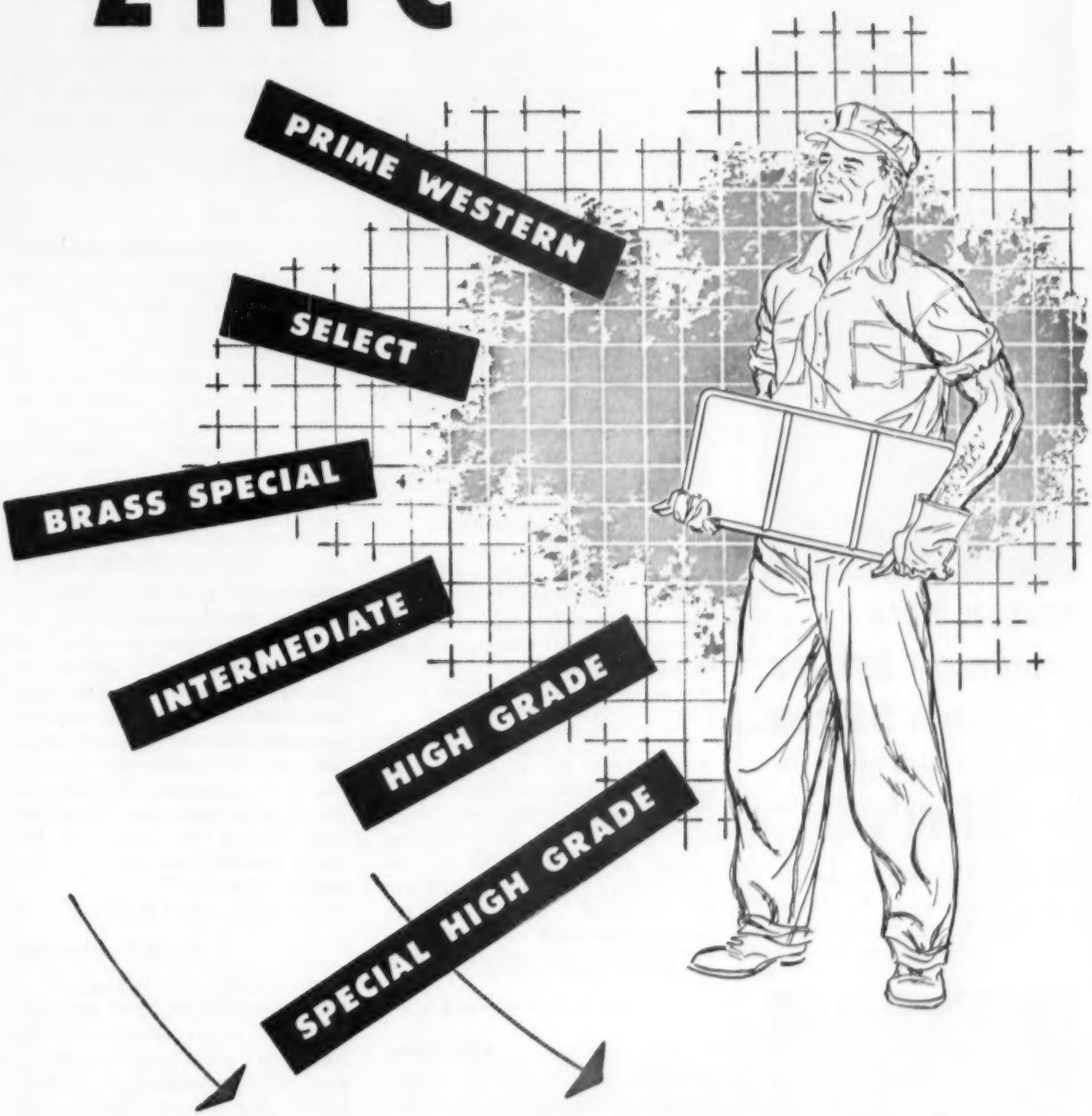

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New Technical Literature:

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Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Pulley

The Homer Hercules permanent magnetic pulley applications and features are described in this new bulletin. These pulleys automatically remove tramp iron from sand, slag, ore, chemicals, coal, cement, gravel, foods, feeds, etc., and separate ferrous from nonferrous materials. The bulletin includes diagrams, performance data, specifications and a guide for selecting proper size. *Homer Mfg. Co., Inc.*

For free copy circle No. 1 on postcard, p. 113.

"Copymill"

The "Copymill," a machine designed for high-speed automatic contour milling, is the topic of this booklet. The machine is for the production of aluminum components for the aircraft industry. Its weight is consistent with torque and horsepower requirements, and spindle speeds are optimum for milling aluminum, according to the booklet. Advantages include reductions in original cost, space requirements and machine time. *Mercury Engineering Corp.*

For free copy circle No. 2 on postcard, p. 113.

Steels

High-strength low-alloy steels are described in this new bulletin. The characteristics of the steels, their corrosion resistance, how they are formed and worked, and the design factors involved in their use are discussed. Applications are given. Economics of application are explained. *International Nickel Co.*

For free copy circle No. 3 on postcard, p. 113.

Facilities

Daco instruments and instrument tooling is covered in this new booklet. Among subjects covered are design engineering, tool engineering, toolmaking, diemaking, experimental work, jig borers, jig grinders, grinding, lathes, and milling and profiling machines. *Daco Machine & Tool Co.*

For free copy circle No. 4 on postcard, p. 113.

Resistance welding

Resistance welding at work is the subject of this booklet. Several case histories of Sciaky patented three-phase electric resistance welding equipment are given. Economy and increased production are among advantages stressed. Equipment is pictured and described. Specifications are included. *Sciaky Bros., Inc.*

For free copy circle No. 5 on postcard, p. 113.

Pallet boxes

"Generalift" pallet boxes are covered in this new booklet. It describes and shows how low cost wirebound pallet boxes are used in industry for production line hoppers, intra-plant shipment of parts, assembly line bins and as permanent storage bins for manufacturing, food processing, chemical and many other industries. Various skid designs for simplified lift truck handling are shown. *General Box Co.*

For free copy circle No. 6 on postcard, p. 113.

Switch catalog

Micro Switch subminiature snap-action precision switches, auxiliary actuators, subminiature switches, toggle and push button subminiature switch assemblies are covered in this new catalog. The catalog gives information on the standard subminiature single-pole, double-throw basic switch, as well as the long life, high temperature and turret terminal versions of switch. *Micro Switch, Div. of Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 7 on postcard, p. 113.

Catalogs & Bulletins

Gear hobbers

Automatic gear hobbers are covered in this new booklet. The helical control method, its feed changes, power rapid traverse, tangent feed attachments and construction are discussed. The machinery is shown and described. Advantages are shown. *Potter & Johnston Co., Sub. of Pratt & Whitney Div., Niles-Bement-Pond Co.*

For free copy circle No. 8 on postcard, p. 113.

Sling chain

Sling chains are the subject of this new handbook. The handbook covers how to order sling chains, and their care, use and inspection. Diagrams, charts and tables on standard and special styles of sling chains and attachments, and their sizes, weights, and working load limits under many conditions of use are given. *Columbus McKinnon Chain Corp.*

For free copy circle No. 9 on postcard, p. 113.

Grinding machine

The Cincinnati Filmatic No. 2 centerless grinding machine is covered in this new booklet. The machine is shown and highlights of design are pointed out. The features of the machine are shown and described. Dimensional drawings and tables give additional information. Specifications are included. *Cincinnati Grinders, Inc.*

For free copy circle No. 10 on postcard, p. 113.

Titanium tubing

Tubing of titanium is described in this new bulletin. The bulletin gives information on the fabrication of unalloyed titanium tubing. Subjects covered include heat treating, pickling, welding, brazing and machining. Applications are shown and discussed. Advantages include light weight, high strength, high ratio of fatigue limit to tensile range, low linear coefficient of expansion, corrosion resistance, good ductility, formability and heat resistance. *Superior Tube Co.*

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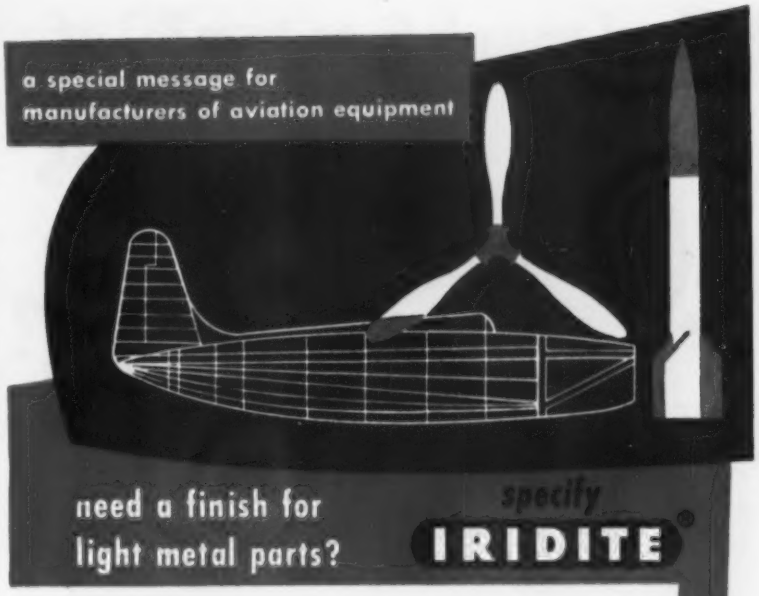

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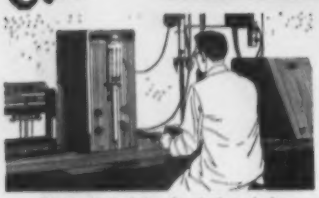

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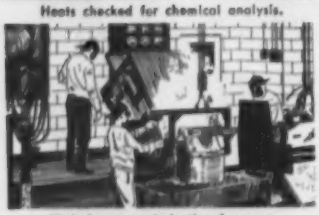

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Slitting machine

Slitting machine operation is discussed in this new booklet. The booklet is intended to be a basic guide for new operators. It describes equipment, set-up procedures, care of equipment and other hints. *Ohio Knife Co.*

For free copy circle No. 12 on postcard, p. 113.

Ramps

Hydraulic adjustable ramps for loading docks are featured in this new booklet. Both types of Rowe dock equipment are illustrated and described. One is the Adjus-A-Dock which is installed in the loading platform or at its level, and the other is the Adjust-A-Truck, installed at ground level to raise or lower the rear wheels of truck or trailer to maintain a continuous flush connection between the vehicle's floor and the loading platform. Both units in use are pictured. Mechanical drawings and specifications give additional information. *Rowe Methods, Inc.*

For free copy circle No. 13 on postcard, p. 113.

Polyken tape

Industrial uses for Polyken tape are shown in this new manual. The manual features a complete listing of industries that use industrial tape. The types of tape best suited for certain applications are listed. Another section is devoted to the basic industrial uses for tape, such as bundling, tube sealing, thread protection, and edging. Each function is described completely. *Polyken Products.*

For free copy circle No. 14 on postcard, p. 113.

Socket screws

The Socket Screw Div., Bristol Co. complete line of socket screws is covered in two new bulletins. Features, manufacturing methods and applications are outlined. Tables give nominal sizes, basic dimensions, and tolerances of the American Standards for Screw Threads. Engineering data and specifications are included. *Socket Screw Div., Bristol Co.*

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where goes AMERICA?

★America must modernize its cities to keep up with a population growth estimated at 180 million by 1960. Every month we add to our population the equal of an Omaha, Nebraska; a Norfolk, Virginia; or a Toledo, Ohio.

Large scale building requires great tonnages of steel, copper, brass, aluminum, other metals, rubber and plastic. For example, a new office building under construction in New York will require 750 tons of sheet and strip for the air conditioning ducts alone. A remodeling of a Y. M. C. A. in our vision is taking 225 tons of steel. How much building is ahead? The year 1954 was the largest in history . . . 1955 is expected to be better.

Are your plants ready for volume production or are you handicapped by old equipment? **New equipment brings down production costs.**

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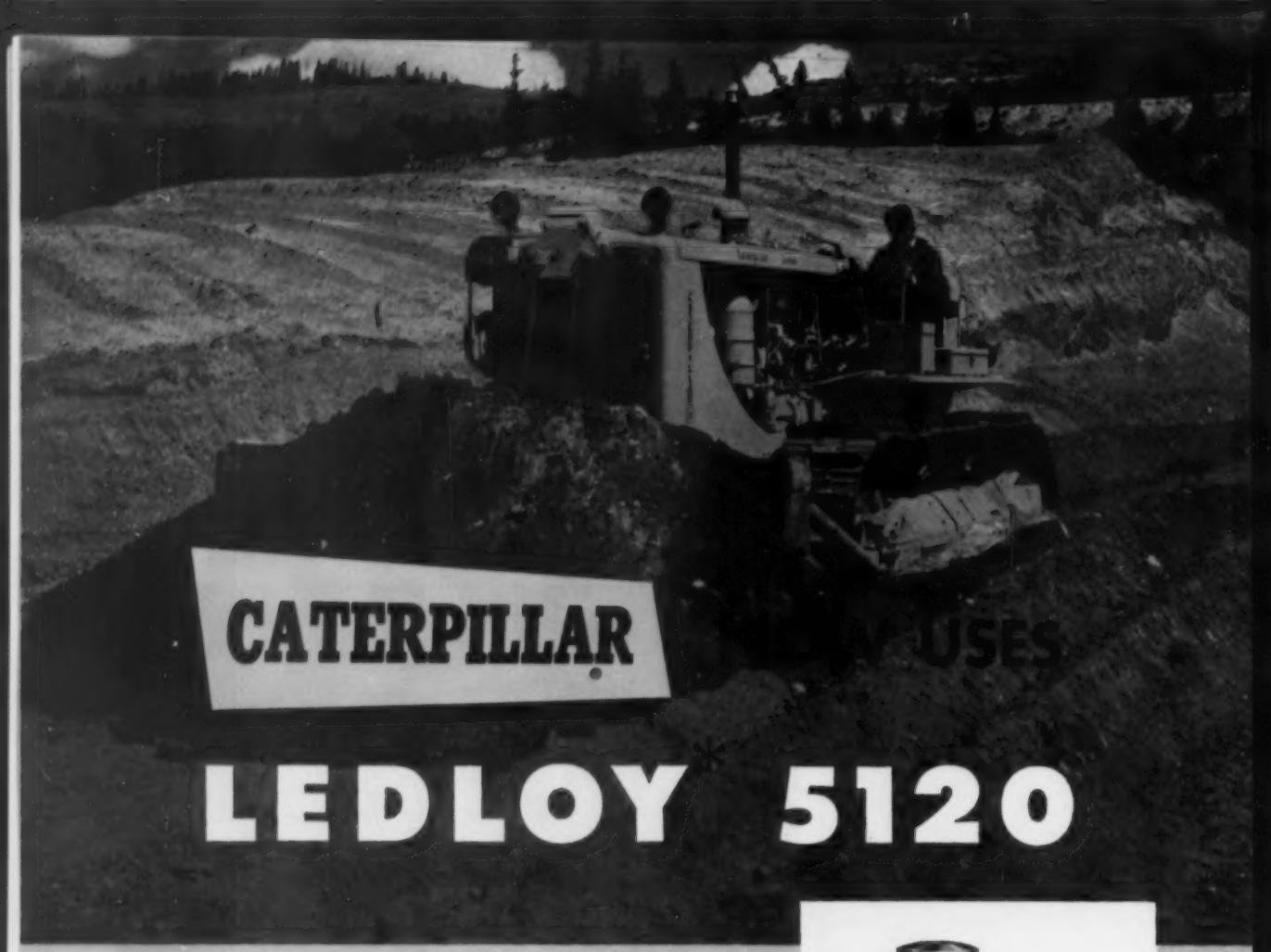


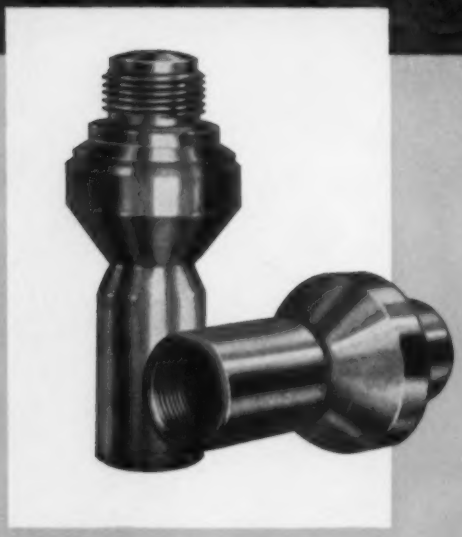
CATERPILLAR USES LEDLOY* 5120

Saves on Every Pre-combustion Chamber Assembly

In today's competitive market, any savings on a component is important, even on a product as large as the Caterpillar D8 crawler Tractor. Caterpillar Tractor Co., with an eye on costs, selected Ledloy 5120 for pre-combustion chamber assemblies in their diesel engines. As a result, machining costs have been reduced on each of the two parts that form the finished assembly. This reduction resulted from Ledloy's free machining properties, which reduced machining time and increased tool life.

Design called for copper brazing the two pieces together and nickel plating the entire assembly. *The Method:* The leaded steel was brazed and plated in the usual way, without special handling. *The Results:* Pre-combustion chamber assemblies made of Ledloy 5120 at a lower cost, met all requirements and are seeing service in Caterpillar-built machines around the world.

*Inland Ledloy License



Two component parts of the Pre-combustion Chamber assembly were machined from Ledloy 5120 cold drawn bars. Other leaded alloy steels and leaded carbon steels are available in all standard or S.A.E. compositions in any of our standard sections. Write for complete information about application of leaded steels to your product.

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This section starts on p. 108

Oxygen steelmaking

Oxygen steelmaking in the United States is the subject of this booklet. The story of the search for improved steelmaking processes is told. The oxygen converter process is covered. A general oxygen converter plant layout is shown. Several graphs give additional information. *Kaiser Engineers Div., Henry J. Kaiser Co.*

For free copy circle No. 16 on postcard.

Welding equipment

Welding equipment, accessories and supplies are covered in this new catalog. Among equipment shown are Weldit complete welding and cutting outfits, torches, welding tips, cutting attachment, heating torch, cutting torches, blowpipe and regulators. Tables give additional information. Complete specifications are included. *Weldit Inc.*

For free copy circle No. 17 on postcard.

Lubricants

Fringe area lubrication with Molykote lubricants is the subject of this new folder. The folder lists all types of this molybdenum disulfide lubricant. New concepts of extreme pressure or boundry lubrication in which solid lubricants perform a major function are discussed. The folder explains the participation of Molykote lubricants in this "fringe area" lubrication field. Eleven major types of Molykote are listed and described as to their ingredients, working temperature ranges and applications. *Alpha Corp.*

For free copy circle No. 18 on postcard.

Industrial lighting

A new concept in industrial daylighting, the use of fiberglas factory window panes in colors, is discussed in this new leaflet. The new "Flat Panes" are available in all standard glazing sizes as well as in three scientifically-selected colors, each designed to solve a specific industrial daylighting problem, according to the leaflet. The shatterproof panes are discussed and shown. Among advantages are ease of installment, diffused light, and built-in color. *Alsynite Co. of America.*

For free copy circle No. 19 on postcard.

Catalog

Machinery carried in stock at the Miles Machinery Co. is shown and described in this new catalog. Among machinery shown are automatics, boring machines, forging, structural and bolt machinery, gear hobbers, drills, cylindrical grinders, lathes and keyseaters. Complete specifications and other data are included. *Miles Machinery Co.*

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Humidity engineer

The new issue of Humidity Engineer, devoted to industrial process and comfort air conditioning, is now available. The issue features an article on the metallurgical advantages of blast air moisture control in foundries. *Kathabar Div., Surface Combustion Corp.*

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Chuck jaws

The Skinner Chuck Co. complete line of soft blank top jaws is covered in this new bulletin. The chuck jaws are accurately machined to American standard jaw dimensions, according to the folder. Long pointed jaws for inside gripping and small diameter work are new additions to the line. The folder also illustrates and describes medium- and heavy-duty tongue, groove and serrated type jaws with American standard drilling and cross keys, serrated keys for Skinner chucks and slip jaws for Skinner two-jaw box body chucks. *Skinner Chuck Co.*

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Temperature control

How Power-o-matic gives automatic proportional wattage control throughout entire oven range is described in this new brochure. The brochure gives a brief development history of the method. The advantages of the method are discussed. The problem of controlling wattage not only as a control function, but also as a matter pertaining to element design and oven operation is discussed. Mechanical convection ovens and industrial batch ovens are also discussed. *Blue M Electric Co.*

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Hasko-Preg

Hasko-Preg, a new wood product, is introduced in this new bulletin. The new product has many applications, mainly in the making of die models or patterns. Its outstanding advantage is dimensional stability. The bulletin gives technical data on Hasko-Preg with special emphasis on its dimensional stability. Also outlined are facts concerning the improved heat resistance, permanency of stability and machinability of the impregnate. Charts and tables give the comparative dimensional change, comparative swelling and dimensional movement due to heat of Hasko-Preg and conventional pattern-making materials. *Industrial Sales Dept., Haskelite Mfg. Corp.*

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FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Ex-Cell-O

Products of the Ex-Cell-O Corp. are shown in this new folder. Among products shown are transfer type special machines, precision cylinder boring machines, vertical precision contouring machines, quill type hydraulic power units, precision profile machines and precision center lapping machines. The growth of the company is described and its place in the metalworking industry is discussed. *Ex-Cell-O Corp.*

For free copy circle No. 25 on postcard.

Files

A brief account of the history, manufacture, variety and uses of files in general is contained in this new booklet. Among topics discussed are how a quality file is born, how to get the most out of files, know your files and get ahead, and the care of files. *Nicholson File Co.*

For free copy circle No. 26 on postcard.

Condensed catalog

Data on valves for a wide variety of applications are given in this condensed catalog. Included in the catalog are dimensions and illustrations describing latest Edward valves. Among these are globe and angle stop valves, pressure seal design, angle univalves and small size globe valves designed for chain or extension operation in vertical lines. Also included is the new Mudwonder mudline valve which is suitable for abrasive fluid application in industry as well as mudlines in oil field. *Edward Valves, Inc.*

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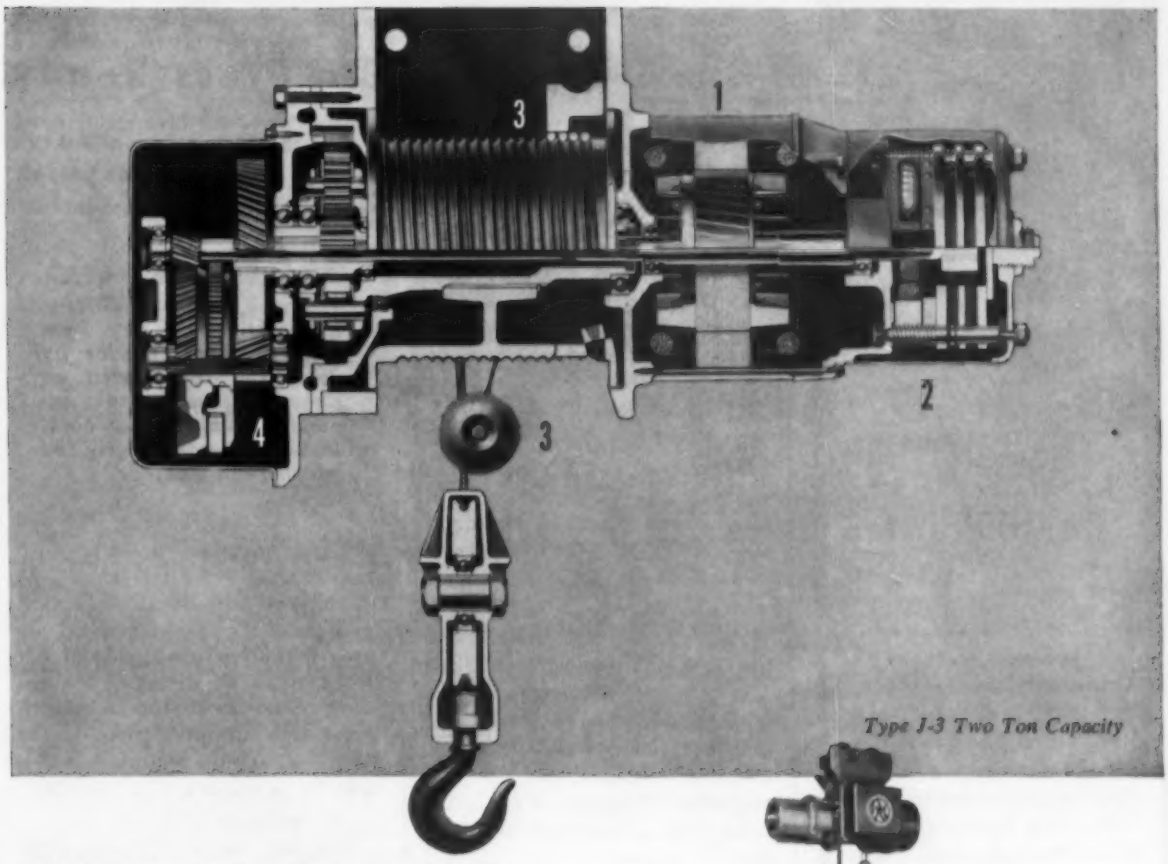

Type J-3 Two Ton Capacity

BIGGER LOADS: FASTER PACE

A JOB FOR THE J-3: While today's bulk loads often weigh more—by 25% to 50%—they must be lifted, moved, and spotted more quickly than yesterday's. This is a job for Robbins & Myers J-3 two-ton electric hoists, which meet these conditions, offering long life, high performance, low operating cost—and at low first cost:

1	**MOTOR**	2 HP Robbins & Myers, fully enclosed, 30-minute heavy duty rating—built exclusively for hoist duty.
2	**MOTOR BRAKE**	Oversize, magnetic disc type—stops load without drift.
3	**LIMIT SWITCHES**	Upper and lower—positively prevent over-travel of block for extra safety, lower limit switch stops hoist with two wraps of cable still snubbed on the drum.
4	**LOAD BRAKE**	Self-adjusting, Weston type—operates in oil bath.

Other R & M Hoists and Cranes available in ratings from 500 to 20,000 pounds.

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LEADER POINT CAP SCREWS

Dropping, knocking against metal surfaces and faulty line-up are major causes of damaged threads. Allen's new unthreaded leader point substantially reduces the causes of screw thread injury, or damage to threaded holes. Grip Heads, precision fit sockets that adhere to the key, *plus* the new leader points, make Allens the world's easiest starting cap screws, particularly in inaccessible spots. Sold *only* thru leading Industrial Distributors.

ALLEN

MANUFACTURING COMPANY

Hartford 2, Connecticut, U.S.A.

FORGING: Big Press Ready

A big, new 8000-ton forging press, set up at Alcoa's Cleveland Works on lease from the Air Force, will soon provide an important source for aircraft forging production.

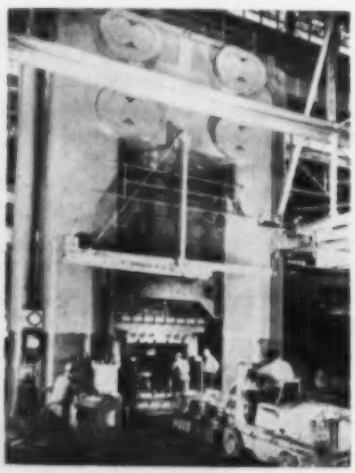
A metal forging press weighing almost 4 million lb and capable of applying 8000 tons pressure for forging metal has begun operation at Aluminum Co. of America's Cleveland works.

The 8000 ton press, which was supplied to Alcoa under a lease arrangement with the U. S. Air Force, is an important production tool for vital aircraft forgings.

The 8000 ton unit fills an important gap in a versatile line-up of aluminum forging equipment at the Cleveland plant. Previously at this location, Alcoa had presses with capacities of 1500 tons, 3000 tons and 15,000 tons respectively with no intermediate size unit available. The gap in press size quite often placed limitations on forging design.

Press Dimensions

The size of the press is indicated by its overall height of 55 ft with 38 ft above floor level. The die area in which forgings can be produced is 11½ x 4½ ft.



Big forging press . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Large precision aircraft forgings of the close tolerance low-draft type will be an important product of the press. The large die area will allow production of big forgings not requiring the tremendous pressures of the 15,000 ton press now in production or the 35,000 or 50,000 ton presses which will be in operation in Cleveland in the spring of 1955.

The new press will also offer greater capacity for the production of magnesium and titanium forgings. It will be valuable too for the production of nonmilitary forgings such as automobile and truck wheels.

Has Greater Capacity

Among the unusual features of the 8000 ton press are its departure from conventional tie-rod design to increase rigidity and accuracy and its large die area.

Most big hydraulic presses are held together by a number of big threaded tie-rods which act like giant bolts to prevent the press from pushing itself apart as pressure is applied to its dies.

Castings Held Together

The 8000-ton press, which was designed and built by United Engineering and Foundry Co., is put together as though it were one giant rigid steel casting. Actually the unit is composed of a number

of giant castings joined to act as one.

The big castings (seven of them weigh over 400,000 lb each) are held together by unique shrink links. Rings are heated and fit over lugs on each of the big castings. As they cool and contract over the lugs they hold the castings firmly together. This one-casting rigidity permits extremely accurate guiding or forging dies and allows close tolerance work.

Foundry:

Weighing device helps improve casting quality.

Improved quality control and savings in the handling of molten metal have been gained at the Washington Mould, Machine and Foundry Co., of Washington, Pa., through the weighing of molten metal.

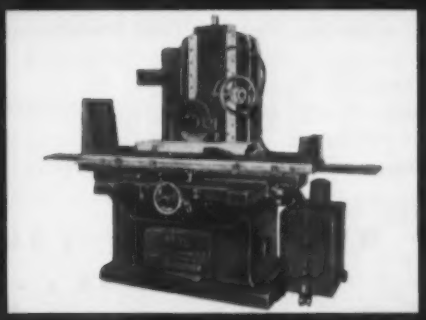
A Dillon Dynamometer is used for weighing. This is placed in series between the crane hook and the ladle. An asbestos shield between the Dynamometer and the ladle wards off direct heat rays.

Prior to the installation of this equipment, pouring was done on the basis of estimated weight. This method resulted in considerable wastage because of incomplete final pourings, especially on large, expensive jobs.

Now such loss has become a negligible factor since total remaining weight is always shown on the dial.

Weighing molten metal . . .

When the need is for SPEED —and PRECISION



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Here is extra value, extra accuracy, extra high-speed performance. Every Grand Rapids Hydraulic Feed Surface Grinder has a one-piece column and base for vibrationless rigidity and permanent alignment between cross travel ways and upright headways. Both longitudinal table travel and cross feed are hydraulically operated. On the larger machines, the wheel head is powered for rapid vertical travel. ***The model 55 has longitudinal table speed of 125 fpm.!***

All parts are machined to micrometric tolerances and precision assembled for perfect freedom of action and entire elimination of play. That's why 6 out of 10 of these machines are sold to firms already using Gallmeyer and Livingston grinding machinery.

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NAME
POSITION
FIRM
FIRM ADDRESS

Vibration:

Special mountings eliminate need for expensive foundation.

Growing experience with vibration absorbent mountings may make expensive concrete foundations for many hammers unnecessary, some specialists in engineered vibration controls believe.

In tests conducted in the plant of the Pneumatic Drop-Hammer Co., Braintree, Mass., a standard model hammer, weighing 21,000 lb. and including a 900 lb falling ram weight, was mounted—without bolting—directly on four Korfund Steel-Spring Vibro-Isolators, one under each corner of the anvil.

Internal Leveling Screws

The isolators contained internal leveling screws which eliminated shims and simplified leveling. They were not bolted to the machine or to the floor.

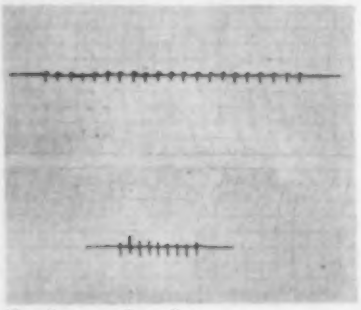
No special concrete foundations or timber pads, commonly installed under this model hammer, were used. An oscillograph was set up with the acceleration pick up placed on the floor immediately adjacent to the isolators. During the tests, readings were taken to determine amplitude of the floor movement due to the impact.

No Shock Felt In Floor

During operation of the hammer in a production type run, speed of production and quality of work were equal to that produced by a conventionally mounted hammer.

No shock could be felt in the floor by persons standing nearby. With the pick-up right beside the hammer, operation produced no more recorded movement on the

Absorbent mountings . . .



Reduce shock . . .

Test — and be *sure* your material is . . .

You save metal and manpower by testing for drawing qualities and stretcher strain.

Tests thickness to ¼" for drawing ability . . . capacities up to 40,000 lbs. Simplified hydraulic controls. Widely used for steel and non-ferrous sheets and strips.

(CUP-TEST)

Quick yet non-destructive method to determine sheet metal suitable for forming parts . . . and need for roller levelling. Hand operated, portable, lightweight and economically priced.

(FLEX-TESTER)

Steel City has qualified sales representatives in major metal-working areas for your convenience. Write today for name of nearest representative, and detailed information on complete line.

Manufacturers of machines for testing physical properties of metals, including:

Steel City Testing Machines Inc.
8815 Lyndon Ave., Detroit 38, Mich.

Brinell Hardness | Ductility | Tensile | Compression
Transverse | Hydrostatic | Proving Instruments | Flex-Tester

. . . and Special Testing Machines.

oscillograph than slapping the floor adjacent to the pick-up with a bare hand.

With the hammer operating and the pick-up set on the floor approximately 12 ft from the hammer, the oscillograph did not record any vibration in the floor.

The tests indicated it is possible to operate hammers without costly permanent, concrete foundations or timber pads and without transmitted vibration.

Hydraulics:

Separator type accumulator eliminates shocks, surges.

Newest addition to the field of hydraulic devices designed to maintain constant pressure, eliminate shock and surges, and compensate for fluid leakage in hydraulic systems, is a large-capacity separator type accumulator recently developed by Superior Hydraulics Div., Cleveland.

The cylindrical double shell accumulator incorporates a floating piston which transmits the pressure of the precharged gas to the working medium and prevents entrainment of the gas into the hydraulic fluid.

Gas Into Outer Shell

Gas is introduced under pressure into the outer shell of the accumulator. In turn, the gas is permitted to enter the upper end of the inner cylinder. There it exerts its pressure against the floating aluminum piston.

The constant pressure of the gas against the piston forces it against the oil which enters the pressure balanced inner shell from the main hydraulic line. The pressure of the working medium in the outlet line is thereby maintained at constant pressure.

Eliminate Piston Hammering

In this design, the outer shell acts not only as a gas container, but also as a protective cover to insure that damage inflicted throug rough handling will not interfere with the free movement of the piston.

The piston is designed with a dashpot to decelerate the piston

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travel, thereby eliminating piston hammering, and makes the entire swept volume of the unit available for work. It is also equipped with spiral Teflon backup rings to reduce frictional wear and with standard "O" rings to prevent internal leakage and facilitates easy maintenance.

In addition, the piston has pressure balancing ports to provide equal pressure to either side of both rings which eliminates the tendency to extrude, and the possibility of pressure lock between the "O" rings. The temperature of the accumulator is maintained at the lowest possible level during rapid cycling, due to its low gas compression ratio.

The accumulator eliminates the necessity of a compressor and possible machine downtime which results from a malfunctioning component that is encountered in other types of installations. In addition, it permits the designer to simplify his design and lower installation costs.

Grinding:

Machine grinds close to projecting surfaces.

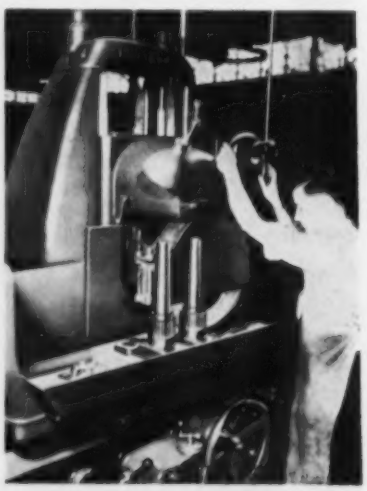
Many high powered precision grinders, when fitted with relieved wheels, are capable of grinding close to projecting members on a work piece. This is especially useful in reconditioning dies since it eliminates the need for removing surface pins. Enough clearance is provided to allow the wheel to surface directly up against leader pins without removing anything from them.

Aircraft Engine Parts

One interesting application of this type operation, done with a Mattison grinder, is the grinding of crank cheeks for counterweights. These are component parts of 14-cylinder Cyclone engines, being ground at the Wright Aeronautical Plant.

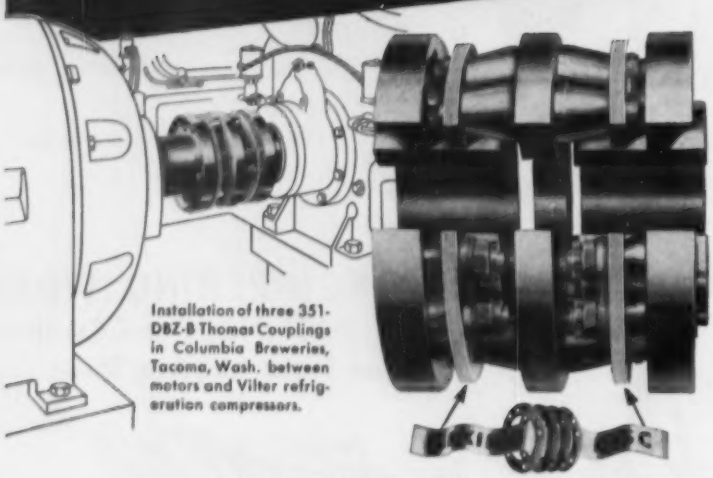
Ground To Close Limits

Held by magnetic chuck, they are ground to very close limits. They are also form-ground on a radius at the junction of the cheek with the body of the shaft.



Close grinding operation . .

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



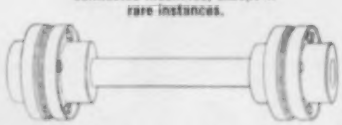
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



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New Books:

"Symposium on Diesel Fuels." Covers the diesel fuel supply and demand outlook, the various problems associated with the procurement and usage of diesel fuels, and fuel specification requirements. A tentative classification of diesel fuel oils is included. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $1.50. 56 p.

"Rod, Bar and Wire Product Information," Kaiser Aluminum. Covers the selection and use of the most suitable aluminum rod, bar and wire for different applications. Fabrication and finishing methods are discussed. Kaiser Aluminum & Chemical Sales, Inc., 228 N. La Salle St., Chicago 1. 160 p.

"The Microscopy of Metals," The Institution of Metallurgists. Contains the lectures delivered at the Institution's Refresher Course held in 1953. The Institution of Metallurgists, 28 Victoria St., London, S.W. 1. 131 p. $2.17.

"Standard Metal Directory," 1954 edition. Lists iron and steel plants, foundries, metal-rolling mills, metal smelters and refiners, and steel rolling mills. Bardeen Press, Inc., 425 W. 25th St., New York 1. 904 p. $15.00.

"Europe." Study of the problems of Europe. Contains chapters on the coal and steel community, historical relations of coal and steel industries, influence of iron and steel cartels, and statistics on coal and steel. Study Project, Free Europe Committee, Inc., 29 W. 57th St., New York 19, 146 p. $1.00.

"ASTM Standards on Coal and Coke," ASTM. Testing methods, definitions and specifications for coal and coke are covered. The standard specification for the classification of coal according to rank and grade is included. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 155 p. $2.25; to members of the Society, $1.70.

"Competition Between Steel and Aluminum," United Nations Covers the development of aluminum and steel as competitive materials. Sales Section, European Office of the United Nations, Palais des Nations, Geneva, Switzerland. 152 p. $1.25.

"Strength and Resistance of Metals," by J. M. Lessells. Gives information on the behavior of metals under stress. Steel is given special treatment. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 450 p.

"Cobalt in Canada," by R. J. Jones, Dept. of Mines and Technical Surveys. Traces development and production of cobalt in Canada and the world, as well as its price history, output and uses. Edmond Cloutier, C.M.G., O.A., D.S.P., Queen's Printer and Controller of Stationery, Ottawa. $1.50. 96 p.

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No. 73

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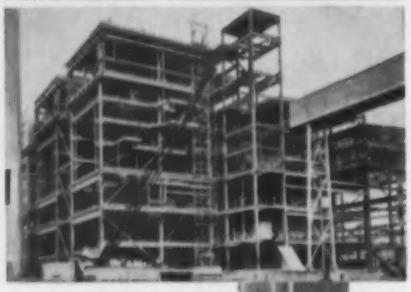

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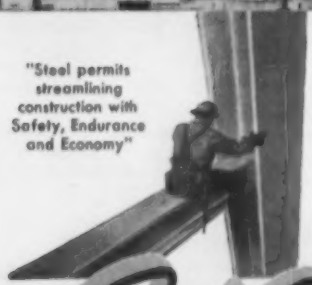
"Steel permits streamlining construction with Safety, Endurance and Economy"



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Materials:

Oxide removed from beryllium copper strip by pickling.

One problem encountered by the fabricator in handling beryllium-copper strip is reported to have been eliminated as a result of a year's research at the plant of the American Silver Co., Flushing, N. Y.

The problem: how to obtain a beryllium-copper strip free from hard, abrasive oxides. The answer: a new type of pickling line that took a year to construct and that represents a five-figure investment in research, engineering, and materials.

Removed In Pickling

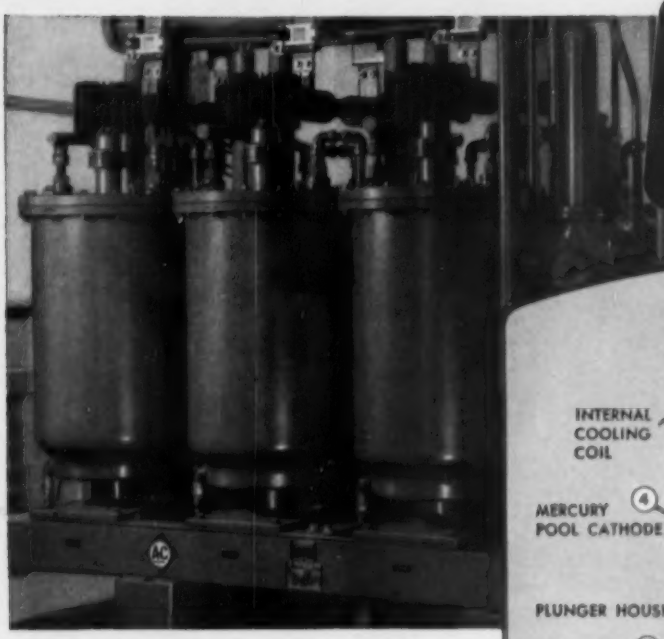
The tenacious beryllium-copper oxide is now removed from the beryllium-copper strip as it emerges from the pickling line.

This is an advantage to fabricators of this material. The presence of the oxide not only made the beryllium-copper strip more difficult to handle, but frequently raised the cost of fabrication.

BETTER WAYS to treat steel to make paints last longer and to assure better metal protection are being sought by scientists in the Research Div. of New York University's College of Engineering. Here, a research worker listens through earphones of a film meter to impulses produced in steel panels treated with zinc phosphate and iron phosphate.

Here's the Rectifier That Needs

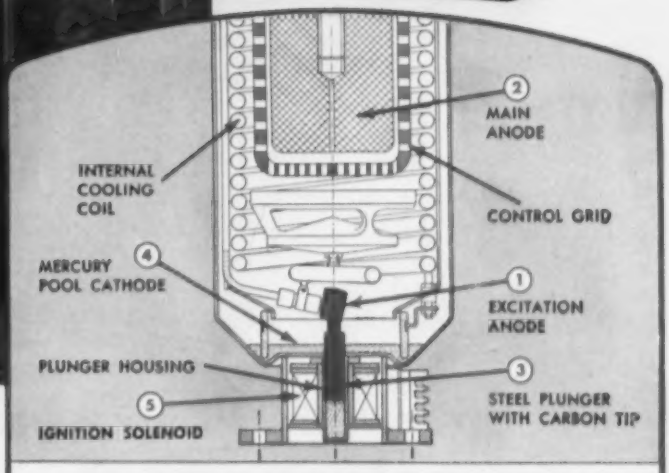
No Delicate Adjustments



This 1000-kw, 6-tube excitron rectifier is typical of units used for heavy-duty service in many industrial plants.

ALLIS-CHALMERS

Mercury Arc Rectifiers



Unique Plunger Starts Continuous Excitation

The excitron tube has an excitation anode ① in addition to the main anode ② . With the excitation circuit de-energized, the steel plunger ③ floating in the mercury pool cathode ④ makes positive contact with the excitation anode (as shown).

When the excitation circuit is energized, the ignition solenoid ⑤ pulls the steel plunger ③ away from the excitation anode ① and under the mercury pool cathode ④ , thus drawing a dc arc and forming the cathode spot, which makes conduction of load current by the tube possible.

If power is interrupted the plunger will float up, contact the excitation anode and automatically re-establish the excitation arc when power is restored.

LITTLE MAINTENANCE IS NEEDED with Allis-Chalmers excitron-type rectifiers. Excitation of the excitron rectifier is continuous, while other types of rectifiers require re-ignition 60 times a second.

Since it is more difficult to start a rectifier arc than to maintain it, the excitron rectifier is much less likely to lose excitation during operation. Momentary dips in supply voltage which are encountered in many supply systems have no effect on the continuous excitation arc.

Years of operation in hundreds of installations have proved the reliability and ease of operation of Allis-Chalmers mercury arc rectifiers. You can get complete information from your nearby A-C office. Or write Allis-Chalmers, Milwaukee 1, Wis.

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ALLIS-CHALMERS

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FOR EASY HANDLING ON TOUGH JOBS . . .

and get "More Use per Dollar"

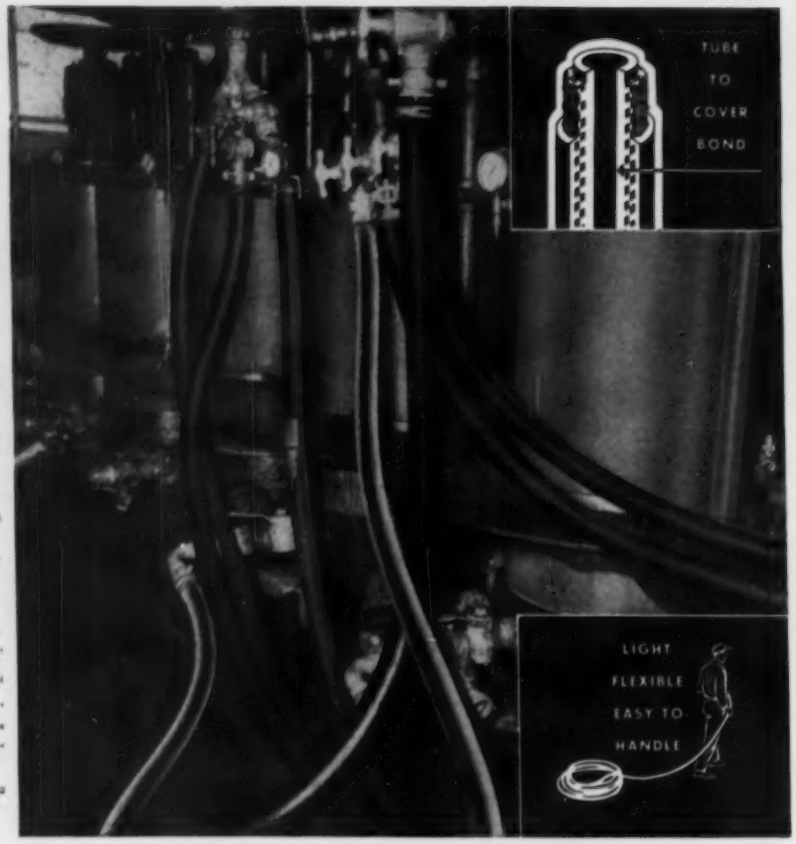
Select a light weight hose construction that is flexible and kink resistant for long-life dependability.

Hose that is light in weight—yet strong enough to safely withstand high pressures—is easier to handle. Men like it better and do more work with it. Look for a hose that is light, yet strong, for ease of handling.

If the hose you buy resists kinking you are assured maximum flow under all operating conditions. Hose that is mandrel-made, rather than molded in a pre-set coil, will coil and uncoil freely in any direction . . . eliminate points of strain at kinking points that can cause costly internal damage and rupture.

Make certain the hose is engineered for maximum flexibility . . . from tube to cover. Tube-to-cover flexibility prevents separation of cover, tube or strength member plies . . . reduces hose costs by increasing hose life.

Specify the one hose that gives you all these features . . . specify R/M Homoflex Hose.



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The unique construction of Homoflex Hose makes it easier to handle because it is light, has no pre-set twist . . . coils and uncoils easily without kinking. All unneeded bulk has been engineered out. An exclusive process creates a homogeneous cover, strength member and tube that are virtually inseparable to produce a hose construction that is extremely flexible, yet rugged and strong. Homoflex Hose does a better job under tough conditions . . . and it lasts longer. Inside and outside diameters are uniform.

Ask your R/M representative about types of Homoflex Hose for your operations. He can also tell you why other types of R/M Hose for general and special purposes last longer, too . . . give you "More Use per Dollar".

RM-506-F

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NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 113 or 114

Press offers improved rubber pad forming techniques

High pressure metal forming presses, for the Guerin process, are being made with 10,800 and 19,500 tons capacity. Principle of operation of the Diaform press consists of a barrel-like steel container in which there is a rubber diaphragm positioned over a rubber pad. When hydraulic fluid is pumped into the diaphragm, pressure is exerted on the pliable rubber pad and forces it down over the form blocks. After forming, the oil is pumped from the diaphragm and the sliding table containing the formed parts is removed from the press. Diaform presses are hydraulic in operation. *Hydraulic Press Mfg. Co.*

For more data circle No. 28 on postcard, p. 113.

Magnetic separator filters lubricating oil

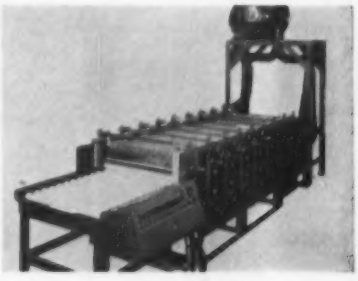
Magnetic filtration of lubricating oil in heavy machinery such as steel mill equipment is accomplished on a new Model 6-PA-6 Ferrofilter magnetic separator. The unit contains in one shell six permanent magnet separator assemblies. Each assembly comprises a stack of thirteen grids graded as to openings, strongly magnetized by a pair of Alnico permanent magnets. Grids are honeycomb design and split oil into thin streams, forcing vagrant particles of steel, iron, rust and scale to pass close to thousands of feet of strongly magnetized grid edges. Strongly convergent magnetic fields attract and hold finest magnetic particles to the grids until the Ferro filter is cleaned. *S. G. Frantz Co., Inc.*

For more data circle No. 29 on postcard, p. 113.

Scrubbing machine cleans both sides of metal sheets

All traces of surface dirt and oils can be cleaned from both sides of metal sheets with this industrial scrubbing machine, and sheets pass successfully the water break test for cleanliness. A long and short model are available, the long machine removing heavier accumulations of surface dirt. Either machine processes sheets at the rate of 60 fpm. A detergent and water solution is pumped onto the plates when they enter the machine. They are scrubbed with nylon cylindrical brushes, and rinsed and dried as they come out. *Fuller Brush Co. Machine Div.*

For more data circle No. 30 on postcard, p. 113.

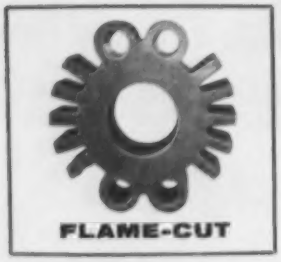


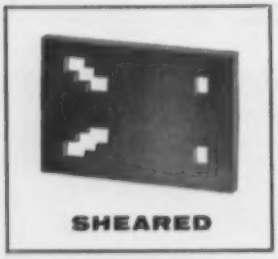
Caster mounting floor lock made of aluminum

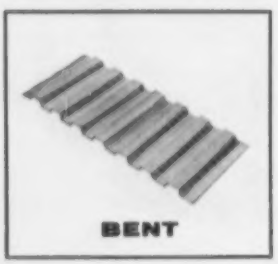
Cast of corrosion-resistant, lightweight aluminum in permanent molds, to insure the ultimate in structural strength and uniformity, a caster mounting type floor lock has 3 in. of floor clearance in the retracted position and positive controlled holding pressure. A 4¼ in. diam floor pad with a flexible joint permits adjustment to uneven floors, automatic compensation for overall height variations. Available in two sizes with an extended mounting height of 7¼ in. or 10¼ in. Units weigh 4½ and 5¾ lb. each, respectively. *Aerol Co., Inc.*

For more data circle No. 31 on postcard, p. 113.

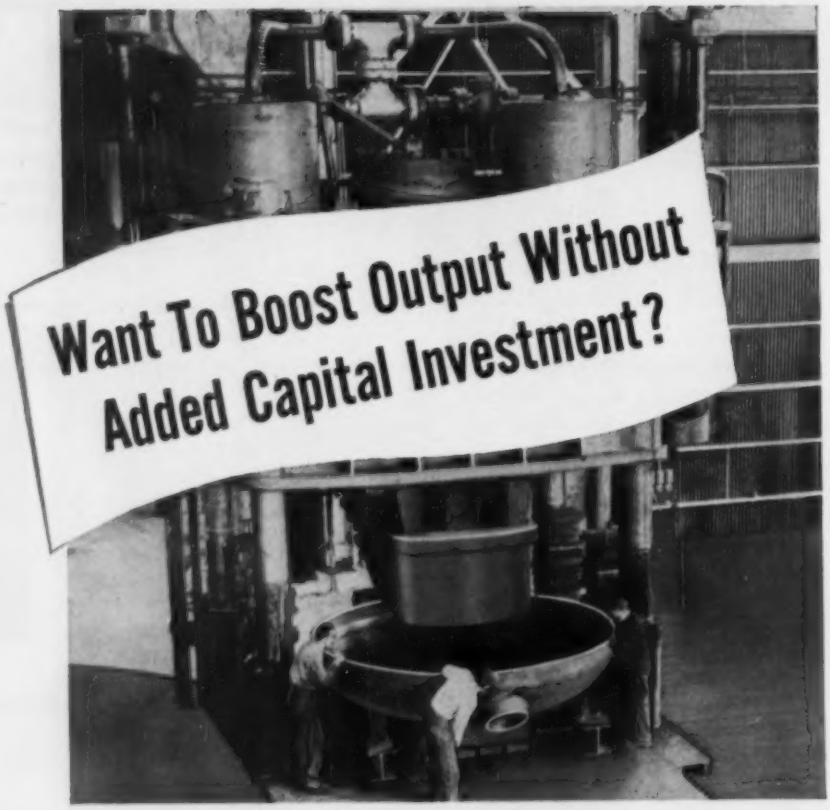
Turn Page







LUKENS



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By-Products Steel Plate Shapes Service provides components that give you the weight reduction, strength and dependability of rolled steel. Direct access to the facilities of the world's leading producer of specialty steel plate means that By-Products can work from plates up to 195" wide or 25" thick, and can give you the benefits of great flexibility in forming and heat treating.

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A Division of Lukens Steel Company, Coatesville, Pennsylvania

Machine threads pipe from ⅛ to ¾ in. diam

Pipe and nipple threading are performed on this new double spindle Landmaco machine. Tangential chaser threading heads are equipped with reamer attachments to enable the threading, reaming and chamfering operations to be performed simultaneously. These dieheads also feature an internal trip mechanism to provide constant thread length regardless of normal differences in the nipple length or in the gripping position. Five spindle speeds range from 133 to 310 rpm. Machine bed is equipped with replaceable hardened and ground ways for guiding and supporting the carriage. Carriages are operated by levers and provide a 6-in. travel. Hammer blow handwheel is used to operate the carriage vise. Entire vise is adjustable, horizontally and vertically to assure work alignment with the die head. *Landis Machine Co.*

For more data circle No. 32 on postcard, p. 113.

Platform scales permit remote weight measurement

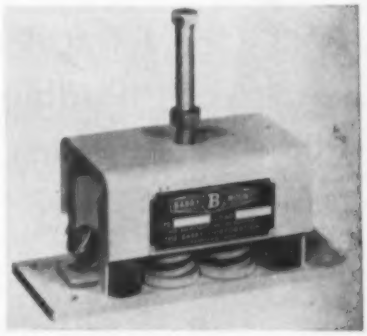
Electrical weighing with automatic control of flowing powdered materials in hopper carts is an application of a new floor-level platform scale. The scales of 500 lb capacity can be set in a pit 10½ in. square and less than 12 in. deep. A variety of instrumentation can be used with the scale, including indicators, recorders, and control equipment. A single direct-reading dial indicator and seven signal lamps will be used with the seven scales used in the above application. Lamps indicate predetermined weights on each scale at which material feed valves will be turned off automatically. The dial indicator can be switched to any scale circuit. The scale incorporates a single Baldwin SR-4 load cell of compression type in which SR-4 bonded resistance wire strain gages are the load sensing elements. *Baldwin-Lima-Hamilton Corp.*

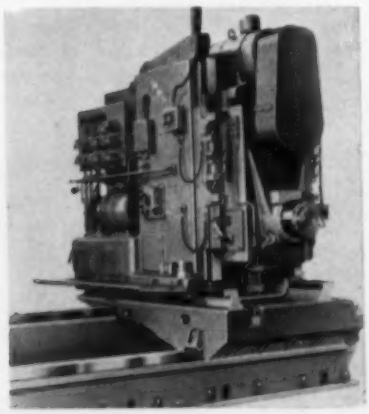
For more data circle No. 33 on postcard, p. 113.

Spring mount for isolation of high impact

Machines can be installed and leveled within a matter of minutes when Barry spring mounts are used. There is no need for bolt or shim. Each mount has a built-in adjustment which permits leveling up to ¾ in. The mounts are designed for use where high absorption of vibration is necessary or where soft floors make control of vibration frequencies difficult. Available in five sizes, with 1, 2, 4, 6, or 9 springs, the mounts depending on size, have an effective load range of 250 to 6700 lb per mount. Simple damping adjustments can be made to prevent sudden spring recoil when a mount is subject to heavy impact and shock and when mounted unit goes through resonance. *Barry Corp.*

For more data circle No. 34 on postcard, p. 113.





Heavy duty milling machine for tank hull production

Special milling equipment can be used on this heavy duty floor type milling machine in the production of M-48 tank hulls. Machine bed is heavy normalized steel with large cast iron ways. These ways carry the saddle, upon which is mounted a housing with vertical ways for mounting the borizontal spindle milling head. Hydraulic cylinders feed the saddle at a variable rate on the main bed. A special barrel type multiple stop positions the movement of the housing forward to predetermined locations. Milling head feed vertically in either direction is arranged hydraulically. The head is single speed type with additional speed available through change gears. Each individual moving unit of the machine is equipped with hydraulically actuated power clamping. Automatic lubrication is provided to all contact surfaces and bearing points. *Motch & Merryweather Machinery Co.*

For more data circle No. 35 on postcard, p. 113.

Turn Page

PICKLING ACID INHIBITOR

RODINE®

Photo by courtesy of United States Steel Corporation, Fairless Hills, Pa.

"Rodine" more than pays for itself in savings of acid and metal. More uniform pickling and better pickled surfaces are obtained when "Rodine" is used in acid pickling baths.

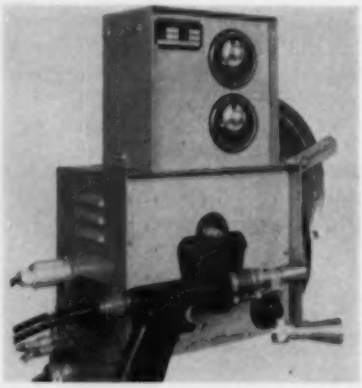
When sheet steel is pickled continuously, "Rodine" improves the surface and prevents "pickle burning" in prolonged pickling.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY
General Offices
AMBLER, PENNSYLVANIA
Detroit, Mich. Niles, Calif. Windsor, Ont.

Spot welding control

An automatic spot and tack welding control for use with Sigma process and constant potentional power source provides an automatically timed cycle for welding. Operator places gun against the workpiece and pulls trigger. The control turns on power, rod feed,

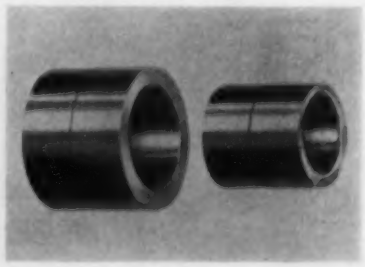


gas and water for an adjustable pre-set welding interval. Rod feed is shut off at an adjustable period in advance of power cutoff to burn back excess rod. Its fully automatic operation and uniform timing produce faster tack and spot welding with consistent high-quality welds. Installation is easy and inexpensive. *Glenn Co.*

For more data circle No. 36 on postcard, p. 113.

Interlocking liner

A precision-made, adjustable, interlocking liner consists of two mated eccentric parts capable of adjusting the location of a hole center as much as 0.062 maximum. A slip fit of 0.0003 for positioning assures precise, easy adjustment. After positioning the parts are pushed together with a press fit of 0.0015 for locking. Adjustability of the liner permits the use of a drill press operation rather



ERIE

In the good old days

WHEN GRANDPA RAN THE BIG FORGING HAMMER

The days of the old-fashioned "Meller-drammer"

Grandpa and all the rest of his crew rode to work on a bicycle built for two. We put in a 60 hour long week . . .

For 20 cents an hour wage, at peak . . .

And, our boss, when things were going fine . . .

For himself a 10 dollar check would sign!

Even then, Erie was THE GREATEST NAME IN FORGING HAMMERS

A 2000 lb. Erie Steam Hammer of about 1909

"IN OUR 60TH YEAR"
ERIE FOUNDRY CO.
ERIE, PA.

than a jig boring setup; permits the correction of minor errors or the relocation of holes for any reason within its capacity. Material is high grade steel treated for uniform 62-64 Rc hardness. *Lee Liner Co.*

For more data circle No. 37 on postcard, p. 113.

Easy die handling

Retractable ball transfers make die handling easy with this electric truck. An attachment consists of two platforms arranged one above the other. Ball transfers are set on the fixed lower platform. Top platform of formed steel plate has openings directly above the ball transfers. It is fixed to the lower platform by a hinged arrangement and is actuated by means of a hand hydraulic pump. When the top platform is in lowered position, the ball transfers protrude above its surface to allow easy movement of heavy dies. As top platform is raised above ball transfers, the die rests solidly on the flat surface for safe transportation. Range of elevation is 9 to 74 in. Capacity is 2000 lb. *Raymond Corp.*

For more data circle No. 38 on postcard, p. 113.

Tube drawing lubricant

In the cold drawing of aluminum tubing, industry is using a new water miscible lubricant. With one application, it is said to permit four successive reductions in diameter and wall thickness. Prolonged die life and bright finish are claimed for the product and in most cases cleaning of the finished tubing is eliminated. *Apex Alkali Products Co.*

For more data circle No. 39 on postcard, p. 113.

Turn Page

IN TODAY'S forge shop

WHERE FASTER FORGING REQUIRES AN ALL-STEEL HAMMER

WHEN each hammergang's 'down time' is so costly if mechanical failure sets in,

WHEN competitive bidding in mass production requires every effort to be costed at minimum

WHEN product perfection must be taken for granted as buyers specify less and less tolerance allowances

The tireless performance of the all-steel construction (in all stressed parts, upper works, frames, and anvils) makes

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50,000 lb. Erie Steam Hammer — the largest ever built

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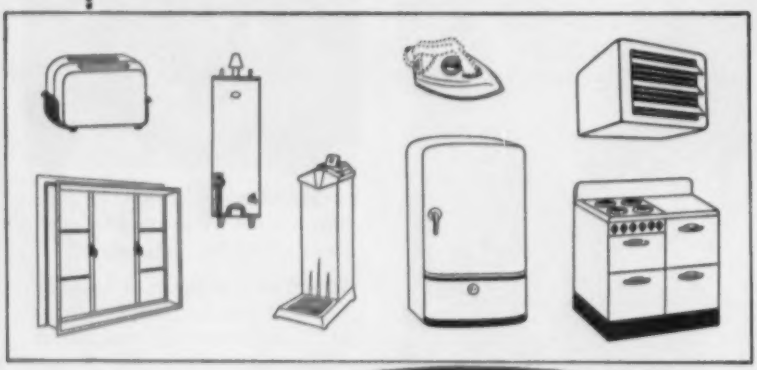
. Increase Your Capacity

WITHOUT CAPITAL INVESTMENT?



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INCREASE YOUR CAPACITY

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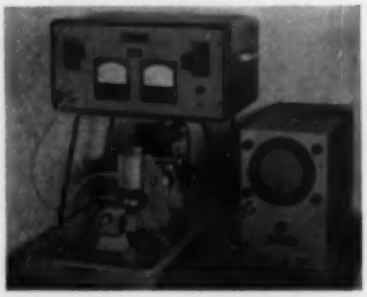
Ball Wavometer

An inspection instrument for measuring the waviness of balls from 1/16 to 1¼ in. diam shows the rms average height of the irregularities in surface contour that occur from 3 to 100 times around a major circumference of the ball. Readings are shown by a meter for each of two wave-bands, in microinches. A range selector switch for each wave band provides full-scale readings of 1, 3, 10, 30, 100 and 300 microinches. *Micrometrical Development Corp.*



For more data circle No. 40 on postcard, p. 113.

Milling chuck

The JAL milling chuck provides a method of holding milling cutters with cylindrical shanks in modern machine tools so that they do not slip or draw out of the chuck. Inner taper of the nose does not rotate against the matching taper of the collet. This feature avoids loss of constructive power and increases the clamping effect. *J & S Tool Co., Inc.*

For more data circle No. 41 on postcard, p. 113.

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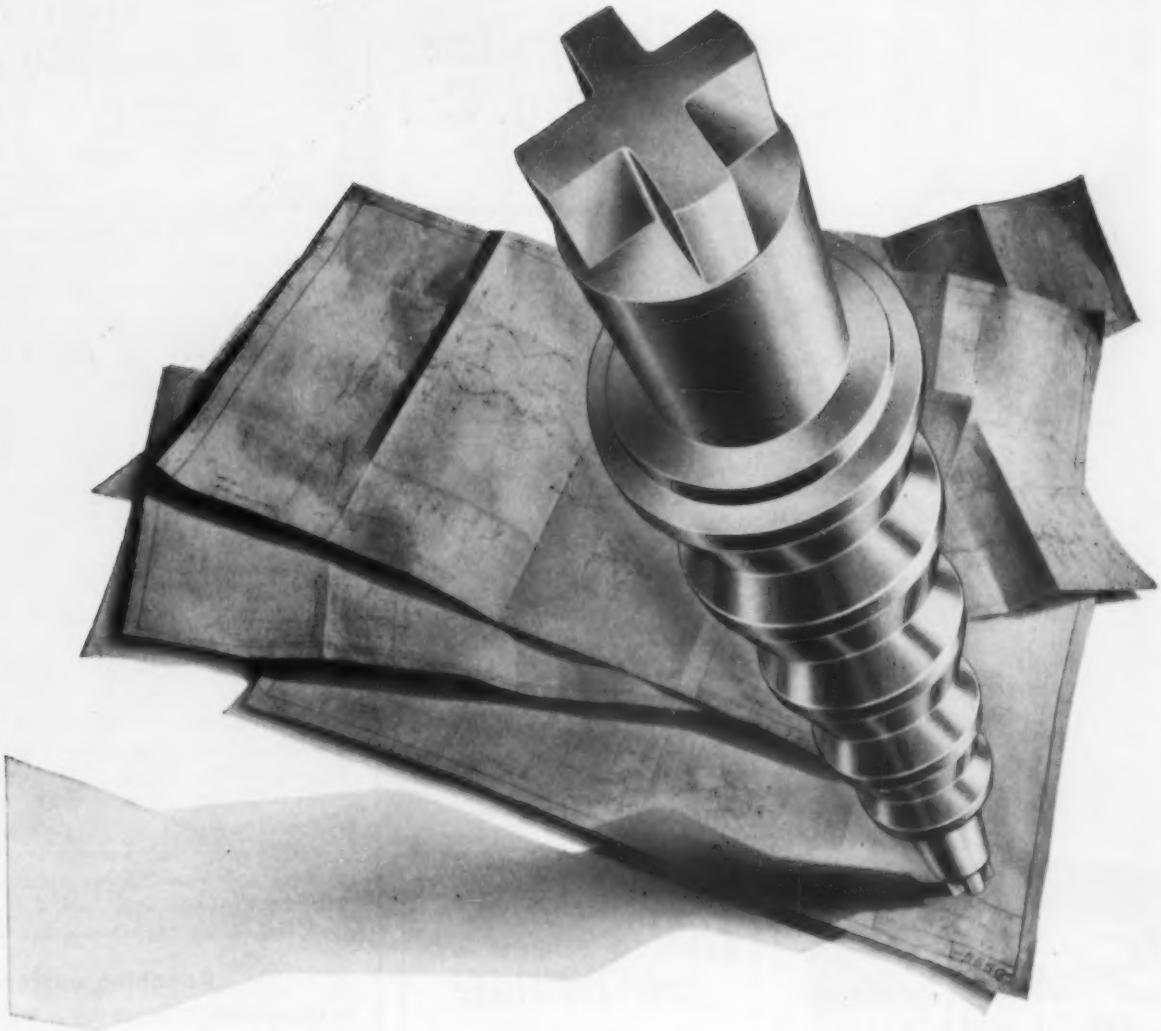

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From the drawing stage of a roll to its final inspection, National always keeps in mind the importance of precision . . . and that is reflected in every roll that National produces. We know that you must have precision in rolls to give your customers precision in rolled metals. So for precision rolls to your specifications, call on National.

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Ideal design for the Ideal Mfg. Co.

Distributed by Sun Glo Studios, New York, N. Y.

With today's trend toward modern styling, Hendrick is becoming more and more important to fabricators of metal products. Typical of these is the Ideal Mfg. Co. of Oskaloosa, Iowa, who manufactures the attractive home furnishing items shown above using Hendrick's Perforated Metal Square Link design.

And this is only one of hundreds of designs Hendricks can supply in commercially rolled metals and gauges with round, square, diamond, hexagonal or slotted perforations. If you would like further information, write Hendrick today.

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TORQUE WRENCHES
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...in inch grams...inch ounces...inch pounds ...foot pounds
(All sizes from 0-6000 ft. lbs.)
Every manufacturer, design and production man should have this valuable data. Sent upon request.

Like to speed up your reading?

Turn to pages 2 and 3 of The Iron Age every week and let the

Digest of the Week in Metalworking

help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

Strippable coating

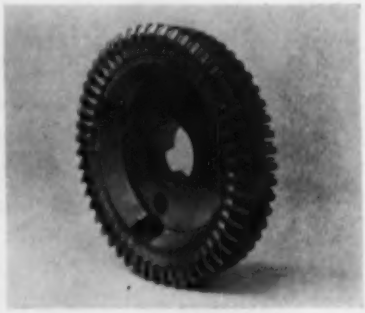
An aluminum-pigmented strippable coating provides a fast, economical method of protecting metal surfaces during interim periods. It may be applied by brush or spray; requires no surface preparation; and can be stripped off easily when desired without leaving a greasy

residue. The aluminum pigment inherent in the coating helps to provide maximum surface toughness and assists in forestalling moisture transmission. Drying time of PV-845 depends upon thickness of coat. A film 3 mils thick, sufficient to provide adequate strength for stripping, will dry to handle in 5 to 10 min under average temperature and humidity conditions. *Specialty Coatings, Inc.*

For more data circle No. 42 on postcard, p. 113.

Roughing cutter

Increases from 75 to 100 pct in tool life while in use on production jobs is claimed for a new extra-close-bladed, high feed rate Shear Clear face mill. The roughing cutter has five carbide-tipped



blades for every inch of diameter. Manufactured in diameters from 4 in. up, the tool will find applications in industries where cast iron is milled at exceptionally high feeds. *Ingersoll Milling Machine Co.*

For more data circle No. 43 on postcard, p. 113.

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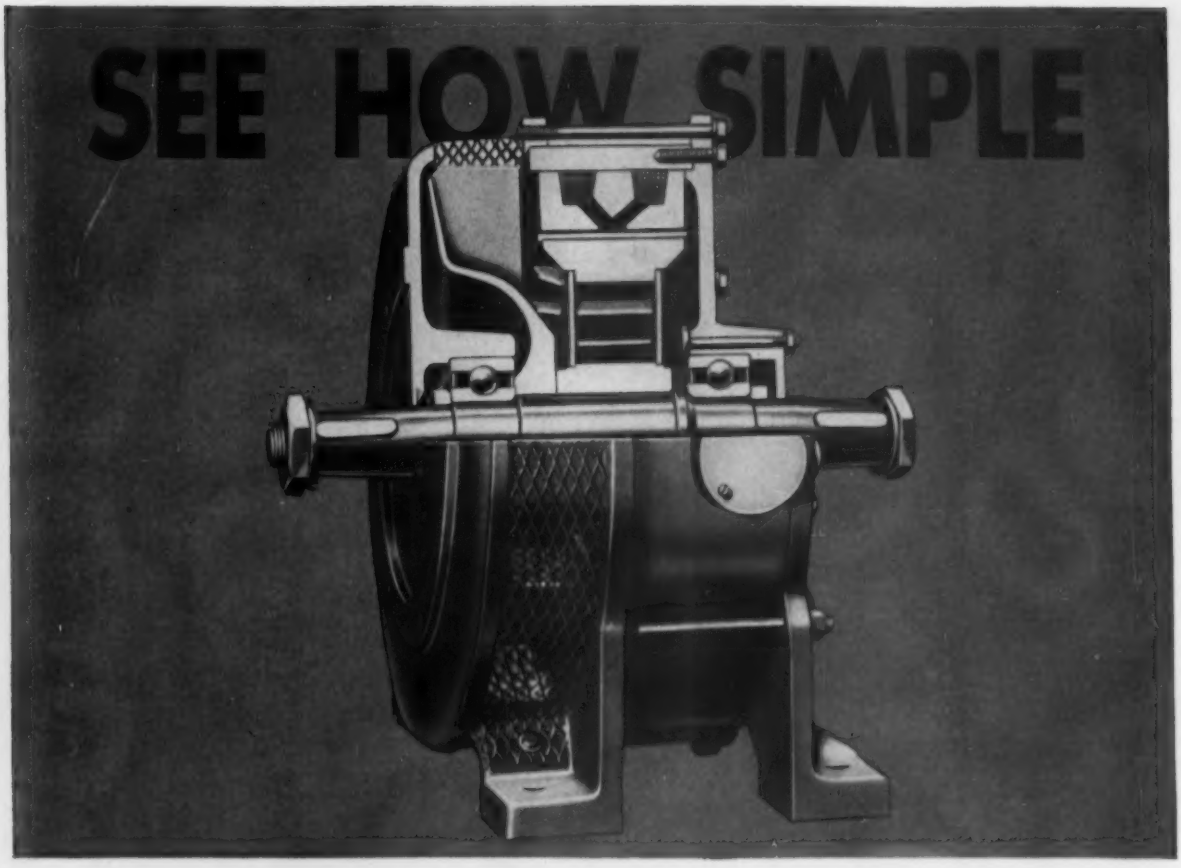
SEE HOW SIMPLE



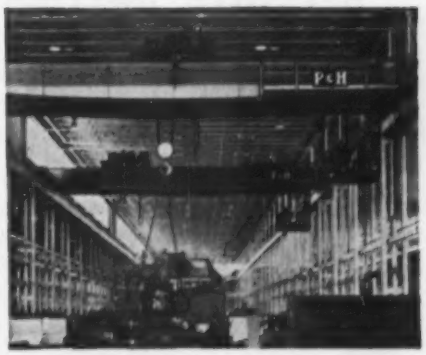
... and only P&H overhead cranes have this better AC CONTROL ... MAGNETORQUE*

Here is what all the talk is about in modern crane control. This is the P&H Magnetorque unit . . . so simple it never requires maintenance.

In this AC crane control there are no rotating electrical parts, never any adjustments to make, no replacements ever needed. With Magnetorque, braking forces are exerted electro-magnetically — without friction, without wear.

As for performance, *this* control provides infinitely fine speed-load characteristics. It's the most responsive crane control yet devised.

Magnetorque is only *one* of the features which distinguish P&H Overhead Cranes as leaders in the field. You can always look to P&H for what's new and better in overhead cranes — soundly backed by the experience of America's oldest and largest producer.



*T.M. of Harnischfeger Corporation for Electro-Magnetic Type Brake.

COMPARE FOR YOURSELF. This new literature contains speed-load curves for all types of crane controls printed on transparent pages so that you can compare one with the other. It clearly explains Magnetorque, has other helpful information. Write for Bulletin C-50

P&H OVERHEAD CRANE DIVISION
HARNISCHFEGER CORPORATION
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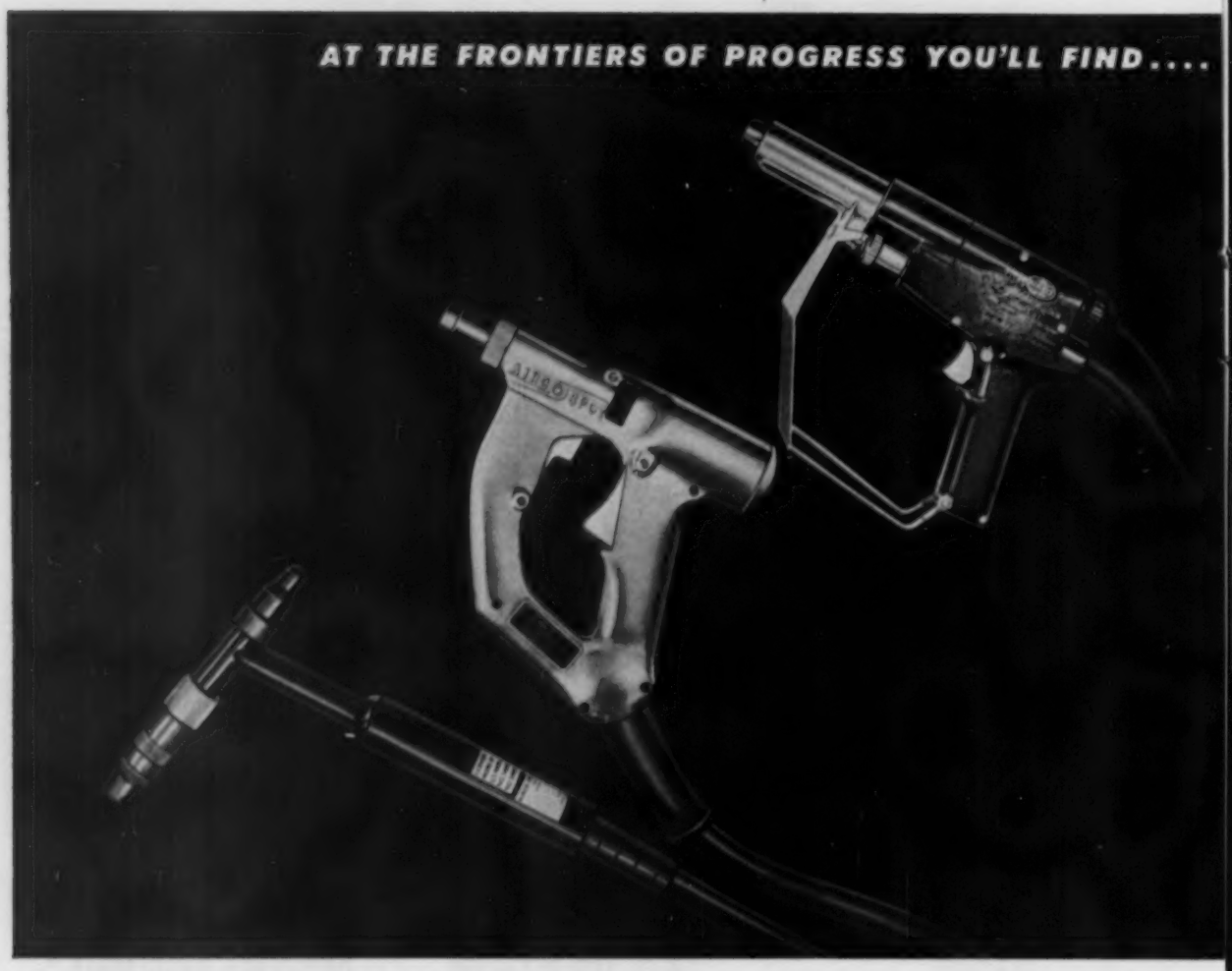
the P&H *Line*

AT THE FRONTIERS OF PROGRESS YOU'LL FIND....



Get Airco Inert-Gas Welding into your Production Picture!

Lower costs through quality and speed . . . that's Airco's answer to your production problem – even when the materials include aluminum, bronze, copper, nickel, stainless steel . . . all engineering metals.

The Aircomatic welding unit, for example, was researched and designed by Airco to produce top-quality welds . . . especially in "problem" metals and alloys without flux . . . with minimum plate edge preparation and little or no preheat. In performance, Airco's Heliwelding is similar – though engineered for high-speed welding of *thin* sections of metals – any metals.

And with the newest Airco addition to inert-gas-shielded welding, Aircospot, you can weld from one side of the joint – eliminating jigs and backup plates. Aircospot is the perfect primary tool for fabrication and no finer cost-saving tool for tack welding has ever been devised.

You'll want to learn more about how Air Reduction's inert-gas-shielded arc welding processes can serve you. Contact your nearby Airco Representative, Authorized Airco Dealer – or write Airco direct.

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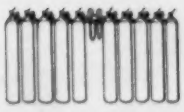
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** – industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** – carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** – medical gases and hospital equipment • **NATIONAL CARBIDE** – pipeline acetylene and calcium carbide • **COLTON** – polyvinyl acetates, alcohols and other synthetic resins.

AN AIR REDUCTION PRODUCT

AIRCO items for inert-gas-shielded arc welding



Air Reduction is your preferred source for the shielding gases you need. Argon, helium, or a mixture of gases are employed for Aircomatic, Heliwelding, and Aircospot. Airco supplies them all. Prompt bulk delivery, as well as by the cylinder, are obtainable.

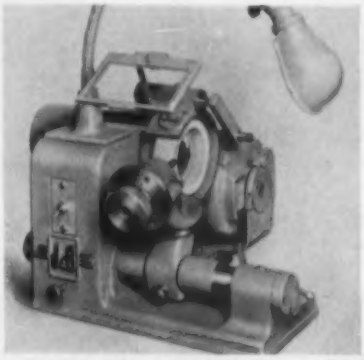
Consult your Airco District Office for specific information concerning gas mixtures and recommendations based on the type of work you are doing.

Airco supplies a complete range of tungsten electrodes for AC and DC Heliwelding. Electrodes are available in pure tungsten, thoriated tungsten, (Thor-Tung) and zirconium tungsten. All three types are offered in seven diameters from .040″ to ½″ and in four lengths from 3″ to 18″. Other lengths of all electrodes on special order.

Aircomatic-Heliweld filler wire is processed to conform to the highest standards for surface finish, cast and cleanliness. Its use assures smooth, uninterrupted wire feed. Specifically designed for use in the Aircomatic manual and automatic head, and the Heliweld filler wire feeder. *Write for literature on these items.*

Cutter grinder

Precision sharpening of single-flute milling or engraving cutters is possible on a new cutter grinder. Its built-in diamond wheel-dresser is mounted on the wheel-guard, allowing the wheel to be dressed without disturbing the tool head. Four super-precision ball bearings

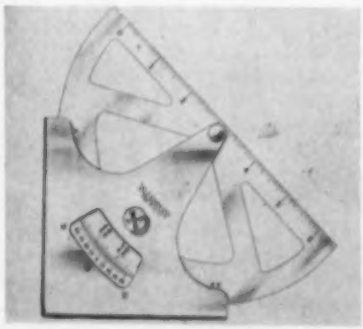


eliminate all end play in the sealed spindle, and the sliding sleeve is completely dustproof. Rocking head is controlled by a thumb screw in the base. Index plunger and dial in tool head accommodate indexing 1, 2, 3, or 4 sides or flats. *Johnson & Bassett, Inc.*

For more data circle No. 44 on postcard, p. 113.

Stainless protractor

Strong, light, rust-proof stainless steel construction; convenient size; fast, positive setting; accuracy to 5′ or 1/12° are features of a new draftsmen's protractor with vernier scale. The protractor lies



perfectly flat on the drawing board and locks at any desired setting. Arc is graduated 90° and figured both ways to read from right or left. Does not have to be reset to obtain the complement of any angle. *L. S. Starrett Co.*

For more data circle No. 45 on postcard, p. 113.

Turn Page

Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Castings of any size up to 80,000 pounds. Hyde Park facilities are equal to your every requirement

Machine Castings
Lathe Beds
Housings
Pinion Housings
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Shoe Plates
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ROLLS

ROLLING MILL MACHINERY

GREY IRON CASTINGS

Everyone recognizes this as a sign of strength...

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May We Send You Our Brochure?

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THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

"Pete is writing a testimonial on, "Why I like BUSTER Alloy Shock Resisting tool steel!"

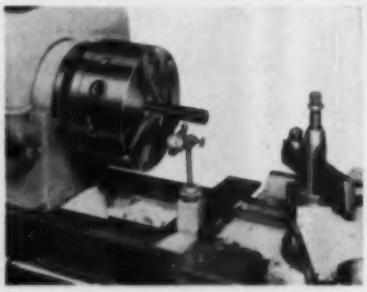
COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

New Horton chucks

Two new chuck lines include the Tru-Set chuck with a guaranteed accuracy of 0.0002 in. Design feature is the micro-screw adjustment of the chuck back which enables the lathe operator to align the workpiece practically within the limits of the accuracy of the lathe. The chuck is available with

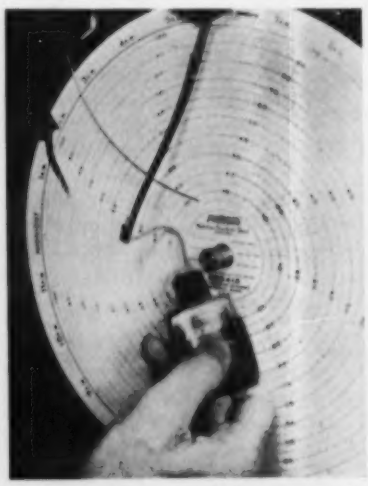


3 or 6 jaws. Each has 3 operating pinions for opening and closing the jaws. Bodies are fabricated from Meehanite. Independent and universal chucks known as the Horton Windsor are also available for straight recess and type L and D1 American spindle nose mountings. *E. Horton & Son Co.*

For more data circle No. 46 on postcard, p. 113.

Recorder ink

New general purpose ink has been formulated for use with Foxboro pens and Humitex charts to produce the sharpest possible record of a process variable. Containing



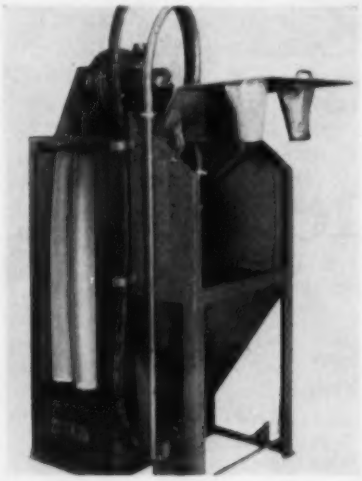
no sediment, the ink is smooth flowing, will not clog the pen, and dries quickly without feathering the chart. It is rated for high tem-

perature, and can be used down to 0°F. Squeeze bottle enables user to pinpoint a precise quantity of ink on the pen without dripping it on chart. *Foxboro Co.*

For more data circle No. 47 on postcard, p. 113.

Small blast-filter unit

Combining a blast cabinet and dust collector in minimum space, the self-contained Blast-Filter Combo cleans small metal parts, ferrous and nonferrous. It is only 2 ft 6 in. deep x 3 ft 3 in. wide with the blast cabinet chamber the same x 26 in. high. The unit is easily accessible from two sides. Operation is simple and easy by a spring treadle—a slight pressure of the



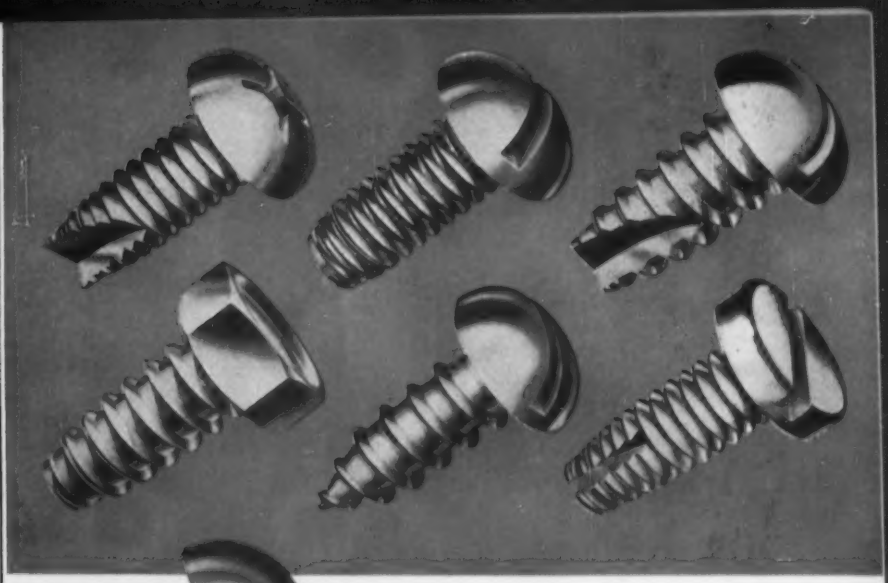
foot starts it; lifting of foot stops it. The Blast-Filter Combo has an integral suction cloth-type dust collector. Filter cleaning of air before reaching the fan protects the fan from wear. The machine can be adapted for soft grit blasting. *W. W. Sly Mfg. Co.*

For more data circle No. 48 on postcard, p. 113.

Temperature indicators

New Tempil° pellets are available for 425° and 475°F. These two intermediate temperature ratings make pellets available in 12½° steps from 113° to 400°F, in 25°F intervals from 400°F to 550°F, and in 50° steps from 550° to 2500°F. They are packaged in tubes containing 20 pellets of a single temperature rating. Each pellet indicates its specified rating with a± 1 pct accuracy. *Tempil° Corp.*

For more data circle No. 49 on postcard, p. 113.



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The Iron Age SUMMARY...

Steel output slated to reach 94 to 95 pct in March or early April . . . Demand from abroad increasing . . . Steel plate potential heavy.

Operations Up . . . The steel ingot rate is pegged at 88 pct of capacity this week but steel mills will be operating at over 90 pct within a few weeks. If the rate of incoming business holds, raw steel output may reach 94 to 95 pct capacity sometime in March or early April.

Added to heavy domestic demand from steel users, there has been a substantial pickup in orders for semifinished steel and flat-rolled from abroad. Some American steel companies have turned down export semifinished business and have been cautious on any export cold-rolled sheet commitments.

Export Demand . . . Demand for semifinished steel and flat-rolled products has come from Britain, West Germany and Italy. The steel shortage in Great Britain and on the Continent will be present for some time. Export demand for steel will probably become so heavy that excess ingots from some American steel plants will find their way abroad in the near future.

With the U. S. civilian economy causing the steel ingot rate to approach 90 pct of capacity a serious turn in international events would create one of the tightest steel markets since Korea. At least 15 pct of current capacity is earmarked for defense purposes; only a fraction of that cushion is now being used to fill defense requirements.

Increasing civilian steel demand is forcing use of less efficient, higher production cost steelmaking equipment. Hence, there is a tendency to allow order backlogs to increase at a rapid rate rather than boost the operating rate too high too quickly.

Lost in the shuffle of current market news is the amazing potential for platemakers, seamless pipe producers and fabricated linepipe firms. Currently planned or proposed linepipe projects involve 8600 miles worth $575 million. Pipelines authorized or approved will take about 6000 miles of pipe and cost $690 million; or a grand total of about 14,600 miles and a cost of more than $1.26 billion.

Plate Potential . . . If all these linepipe projects go through, more than 3 million tons of steel will be required. More than 2 million tons of this steel will represent plate tonnage to be fabricated into pipe.

Deliveries on most steel products were further extended last week. This included bars, wire, structurals and plates—items which heretofore have been getting less attention from steel consumers. Cold-rolled sheets are more or less booked well into the second quarter.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week† 2,110	Last Week 2,070	Month Ago 2,007	Year Ago 1,704
Ingot Index (1947—49=100)	131.4	128.9	124.9	110.4
Operating Rates				
Chicago	90.0	87.0	86.0	83.0
Pittsburgh	83.0	82.0	79.0	90.0
Philadelphia	84.0	84.0*	73.0	76.0
Valley	87.0	85.0*	78.0	70.0
West	88.5	88.0*	89.0	79.0
Detroit	88.0	89.0	100.0	70.0
Buffalo	100.0	100.0	100.0	84.0
Cleveland	81.5	83.0*	85.0	75.5
Birmingham	79.0	79.0	74.0	76.5
S. Ohio River	78.5	95.5	95.5	73.5
Wheeling	98.0	98.0	99.0	81.0
St. Louis	86.5	89.0	78.0	35.5
Northeast	97.0	57.0*	70.0	31.0
Aggregate	88.0	86.0	82.0	74.0

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$35.83	$35.50	$34.33	$26.67
Nonferrous				
Aluminum, ingot	23.20	23.20	22.70	21.50
Copper, electrolytic	33.00	33.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	12.80
Magnesium, ingot	27.75	27.75	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	90.75	89.625	86.125	85.00
Zinc, E. St. Louis	11.50	11.50	11.50	9.50

Buyers Recheck Steel Stocks

New orders coming into steel mills have jumped considerably in past week . . . Market would be strong even without Formosa situation and labor uncertainty.

◆ ALERT steel consumers are taking a closer look at their inventory position as evidence mounts that strength of the market is broadening to include products other than flat-rolled.

There has been a substantial increase in orders during the last week to 10 days. Backlogs are stretching out. Most of the pickup is due to better demand for plates, structurals, bars and wire—products that heretofore had been lagging. Oil country and linepipe also moving into picture.

Add this to stepped-up foreign demand for semi-finished, tinplate, and (from England, Germany, and Italy) automotive sheets, plus an already-tight domestic market for sheets, enameling sheets, electrical sheets, galvanized sheets, and tinplate—and you have the makings of a lively market.

Formosa and uncertainty over outcome of labor negotiations in steel this summer may have something to do with it. But even if you subtract Formosa and labor the market is strong on its own.

At the moment, no one is looking for a runaway market, nor one that will continue at a hectic pace through most of the year. Automotive demand after second quarter is furrowing some brows in steel sales offices. But third quarter is 4 months away. Meanwhile, some items could pinch buyers.

That's why some consumers who overdid inventory reduction in last quarter of 1954 will have a tough time recovering lost ground in the months immediately ahead. Their own high production level is chewing up steel too fast to permit rapid expansion of inventory. They may still be struggling in third quarter, which would soften impact of an automotive slowdown.

SHEETS AND STRIP . . . Cold-rolled sheet output is as good as sold for first half. Some consumers are asking about space for third quarter. Hot-rolled becoming more extended—to 6 weeks on "over 40-in." widths at one **Chicago** district mill. A producer of cold-rolled has turned down offers of heavy export tonnages originating in England, Germany, and Italy. Strip demand—both cold and hot-rolled—is moving up. Specialty strip gaining strength.

GALVANIZED AND TERNEPLATE . . . Galvanized sheets look solid for first half in view of continued strong outlook for construction, air-conditioning, and other applications. Strong market is encouraging construction of new capacity. Automotive demand for terneplate (gas tanks) is taxing production and shipping facilities of producers. Efforts to rebuild inventories of both galvanized and terneplate are contributing to strength of market.

ELECTRICAL SHEETS . . . Demand for this product has moved up substantially in last 2 months. Fractional horsepower motors for appliances, plus a revival of heavy electrical equipment building, have made this a good-to-tight product.

BARS . . . Carbon bar demand is spotty. Market is stronger in **Chicago, Cleveland,** and the **West Coast** than it is in **Pittsburgh,** where mills are backlogged for 3 weeks. But the market has definitely improved in last several weeks and is potentially a lot stronger. Inventory problem seems to be clearing up. Alloy bars also stronger but still on relatively short delivery in some centers.

PLATES . . . Railroads and construction and farm equipment are putting zip into the market. Couple this with anticipated demand for electricweld linepipe and the outlook is for a firm market through first half. Mill sources expect the same number of freight cars will be built this year as last—35,000 domestic and 3000 foreign—but the difference is that inventories are down and builders will depend more on shipments from producers.

STRUCTURALS . . . Construction market is getting hot. Standards moved up in February will do even better in March and April. Wide-flange beams are very strong, likely to get stronger in the months ahead. Outlook for construction is such that fabricator prices will be firming up in the near future. A lot of pencil-sharpening had been going on in months past among fabricators in most areas but the effect on earnings was softened by lower procurement costs. Buying direct from mill rather than warehouses, for example.

GENERAL . . . Northeastern Steel Corp. announced a change in price basing point from Pittsburgh to Bridgeport, Conn., and new base prices effective Feb. 1. New prices: Rerolling billets $69 a ton, forging billets $83 a ton; hot-rolled carbon strip 4.35¢ per lb; hot-rolled alloy strip 7.00¢ per lb; carbon plates 4.475¢ per lb; hot-rolled carbon bars 4.55¢ per lb; and hot-rolled alloy bars 5.225¢ per lb.

Jones & Laughlin Steel Corp. has placed a contract with Aetna-Standard for a new continuous galvanizing line in **Pittsburgh,** part of a $51 million expansion and improvement program announced earlier. Galvanized sheet production is expected to start next Jan. 15. Armco Sendzimir process will be used under license.

Kaiser Steel Corp. bought Union Steel Co., Los Angeles, for "several million" dollars and will operate it as a fabricating division. Plant occupies 16½-acre site. Facilities can handle structural steel fabricating, produce aircraft and missile components, mobile and stationary launching platforms for missiles.

Purchasing Agent's Checklist

DEFENSE: How government spending will affect you . . . . . p. 51

SPENDING: New plant equipment outlays on upgrade . . . . . p. 65

TUBE MILLS: Buying is up despite decline in drilling . . . . . p. 54

Comparison of Prices

(Effective Feb. 8, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Feb. 8 1955	Feb. 1 1955	Jan. 11 1955	Feb. 9 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.513
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes. (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails. (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	Feb. 8 1955	Feb. 1 1955	Jan. 11 1955	Feb. 9 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$36.50	$36.50	$36.50	$28.50
No. 1 steel, Phila. area	36.50	35.50	32.00	25.50
No. 1 steel, Chicago	34.50	34.50	34.50	26.00
No. 1 bundles, Detroit	29.00	29.00	27.25	19.50
Low phos., Youngstown	36.50	36.50	36.50	29.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	42.50	42.50
No. 1 mach'y cast, Philadel'a	43.50	43.50	42.00	39.00
No. 1 mach'y cast, Chicago	45.00	44.50	45.00	34.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$35.83	$35.50	$34.33	$26.67
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	30.00	29.75‡
Copper, Lake, Conn.	33.00	33.00	30.00	30.00
Tin, Straits, New York	90.75†	89.625*	86.125	85.00
Zinc, East St. Louis	11.50	11.50	11.50	9.50
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin ingot	23.20	23.20	22.70‡	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	27.75	27.75	27.75	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$8.00	$8.50	$9.00	$9.50	.....
Birmingham *R3*	$2.38	$2.88	.....	.....	.....
Birmingham *W9*	$2.38	$2.88	.....	.....	.....
Birmingham *U4*	$2.38	$2.88	$6.50	.....	.....
Buffalo *R3*	$6.00	$6.50	$7.00	.....	.....
Buffalo *I1*	$6.00	$6.50	$7.00	.....	.....
Buffalo *W6*	$6.00	$6.50	$7.00	.....	.....
Chicago *I4*	$6.00	$6.50	$6.50	$7.00	.....
Cleveland *A5*	$6.00	$6.50	$6.50	$7.00	$1.00
Cleveland *R3*	$6.00	$6.50	$6.50	.....	.....
Daingerfield *L3*	$2.50	$2.50	$2.50	.....	.....
Duluth *I4*	$6.00	$6.50	$6.50	$7.00	.....
Erie *I4*	$6.00	$6.50	$6.50	$7.00	.....
Everett *M6*	.....	$1.00	$1.50	.....	.....
Fontana *K1*	$2.00	$2.50	.....	.....	.....
Geneva, Utah *C7*	$6.00	$6.50	.....	.....	.....
Granite City *G2*	$7.90	$8.40	$8.90	.....	.....
Hubbard *Y1*	.....	.....	$6.50	.....	.....
Minnequa *C6*	$8.00	$8.00	$9.00	.....	.....
Monessen *P6*	$6.00	.....	.....	.....	.....
Neville Isl. *P4*	$6.00	$6.50	$6.50	.....	.....
Pittsburgh *U1*	$6.00	.....	.....	$7.00	.....
Sharpsville *S3*	$6.00	$6.50	$6.50	$7.00	.....
So. Chicago *R3*	$6.00	.....	$6.50	.....	.....
Steelton *B3*	$8.00	$8.50	$9.00	$9.50	$4.00
Swedeland *A2*	$8.00	$8.50	$9.00	$9.50	.....
Toledo *I4*	$6.00	$6.50	$6.50	$7.00	.....
Troy, N. Y. *R3*	$8.00	$8.50	$9.00	$9.50	$4.00
Youngstown *V1*	.....	.....	$6.50	$7.00	.....
N. Tonawanda *T1*	.....	$6.50	$7.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery iron: Buffalo, *H1*, $66.25; Jackson, *J1*, *G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0-75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

←To identify producers, see Key on P. 151→

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	35.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	—	18.50
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	31.75
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.50
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.25
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.50
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.75
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.00
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50-64.75	51.25-51.50	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15* ,Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

Scrap Shows Strength in East

Market firmness particularly evident in the East ... Price of No. 1 heavy rises $1 in Philadelphia ... The Iron Age Scrap Composite is up 33¢ to $35.83.

◆ SCRAP MARKET continues active with prices remaining firm in most centers. Activity in the East was particularly marked. In Philadelphia there was strong demand for heavy melting grades and No. 1 bundles. Price of No. 1 heavy melting in this district was up $1 which raised THE IRON AGE Heavy Melting Steel Scrap Composite 33¢ to $35.83.

In Chicago there was some weakening of No. 1 dealer grades, although prices remained firm. Increased blast furnace use in the Cleveland area is reported cutting down scrap consumption despite the high operating rate. New York market is very active with most of the business coming from mills in eastern Pennsylvania and from exporters.

Scrap users who are taking a conservative viewpoint on business conditions are running the risk of being caught short if the steel market booms as much as many sources expect. This would mean a much tighter scrap market because of forced buying against heavier metallic needs.

Pittsburgh . . . The market is strong but momentarily at a standstill. Brokers are busy filling old orders and looking hopefully for new business. A large consumer is permitting shipments to a district plant on a scheduled basis after several weeks of hold-up. But his expected re-entry into the market for other mills has failed to materialize. Blast furnace grades are strong. A tonnage of industrial bundles reportedly has been consigned to a small consumer on a conversion deal whereby the mill will deliver semi-finished to an unidentified manufacturer.

Chicago . . . With scrap in dealer grades continuing to move slowly and with fair tonnage moving in industrial scrap and on old orders, prices remained fairly static last week. No. 1 dealer grades were weaker but dealer prices were holding on most grades and a sale in No. 2 heavy melting strengthened the grade pricewise, though the amount moved was not large. The operating rate advanced again but mill purchasing agents continue to hold off, apparently expecting a market drop. The drop hadn't occurred to any large extent in the previous week but a growing willingness by dealers to market No. 1 dealer bundles at $33 suggests this grade could be purchased in fair amounts at a reduced price. Rail, turnings and to a lesser extent electric furnace grades, were soft.

Philadelphia . . . Definite strength prevails in this area as local mills have come into the market for openhearth and blast furnace scrap. Competition is high for heavy melting grades and No. 1 bundles while No. 2 bundles seemingly are being snubbed by consumers. Low phos grades and railroad scrap are quoted higher in sympathy with the trend. Strength—along with some higher prices—has filtered down into the cast grades as well.

New York . . . Market here is definitely on the peppy side with business coming from eastern Pennsylvania mills and from exporters. Steelmaking and blast furnace grades edged upwards $1 per ton, putting No. 1 heavy at $30 to $31.

Detroit . . . Market stayed firm in No. 1 grades and showed increased strength in No. 2 bundles. Although local mills are buying steadily, outside influences, particularly from Pittsburgh, are giving the market its added zest. Dealers have had considerable success in bringing dealer prices closer to automotive list prices, which formerly enjoyed a $3 to $4 premium.

Cleveland . . . Cut structural and plate went up $1.50 at top level after a large purchase by major foundry last week and brokers were reported having trouble covering. At steel mills, increasingly heavy blast furnace use is cutting scrap consumption despite high operating rate and scrap shipments are being held. In the Valley, shipments continue at a high rate. Market is firm but new orders are small.

Birmingham . . . Big demand has developed for electric furnace grades, but little blast furnace or openhearth grades are moving. Some dealers continue holding on to scrap in expectation that prices being paid for export will induce mills to advance prices. Loading of a ship at Tampa has been completed and loading of others at Jacksonville, Fla., and Mobile, Ala., is nearly completed.

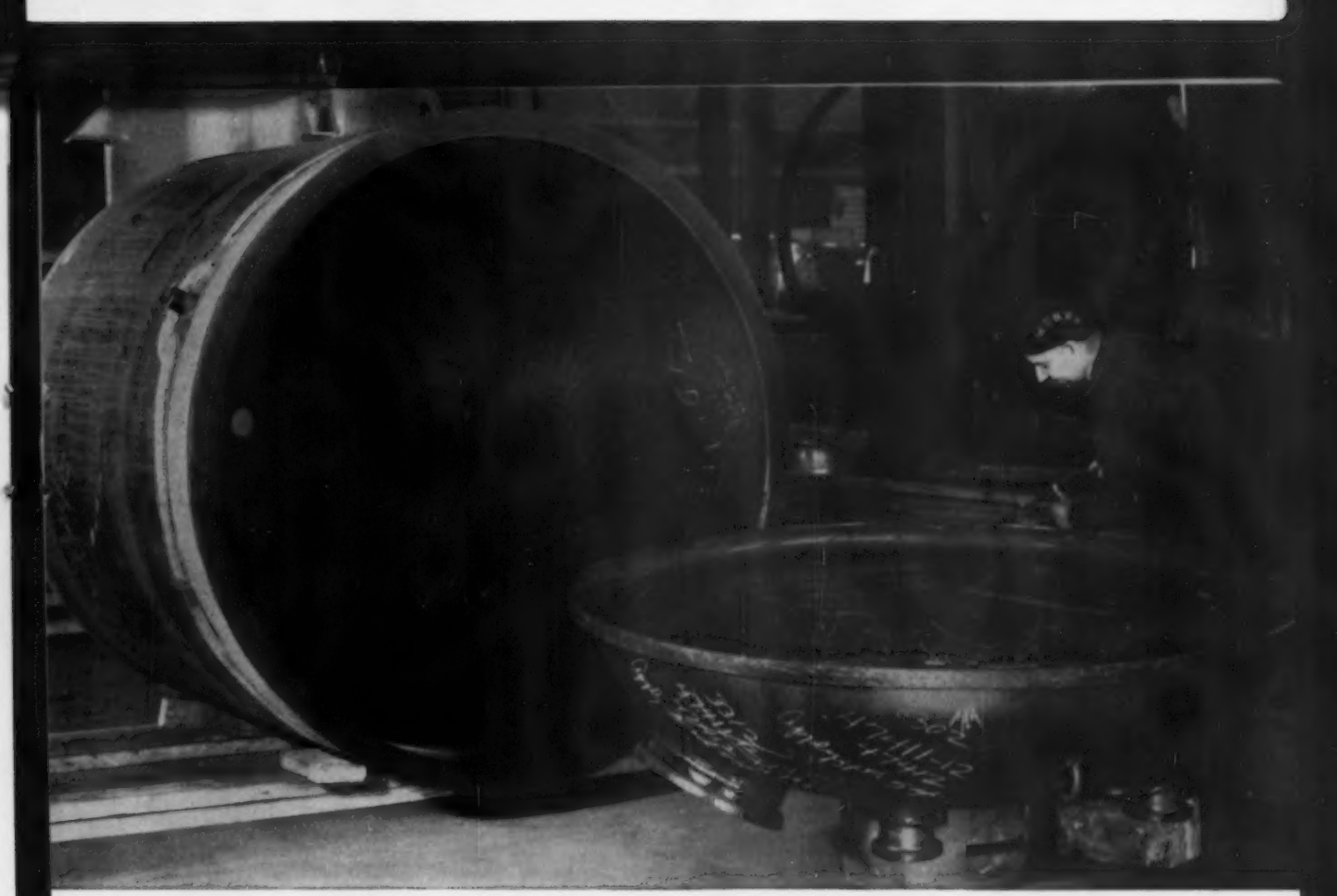
St. Louis . . . The price structure in the St. Louis market remains unchanged. No changes are expected until Feb. 25, when commitments will be made by mills for March deliveries. A steady volume is being received.

Cincinnati . . . Over 5000 tons of No. 1 and No. 2 scrap were barged out of Cincinnati to Pittsburgh last week to meet high demand there. One area mill bought small tonnage of bundles at prevailing prices. Another found no takers at lower price offered.

Buffalo . . . Prices on top quality grades of scrap joined advances posted on other grades a week ago by jumping $1 a ton. Dealers were talking freely of even higher prices for best grades on the basis of current bidding by brokers. New sales were reported in cast within prevailing ranges. Dealers are also looking forward to new business shortly from another top mill buyer.

Boston . . . Trading in the New England market is zipping along well with a price increase for the second week in a row. Openhearth grades —with the notable exception of No. 1 bundles—advanced $1. Some turnings grades also advanced.

West Coast . . . Export activity in San Francisco and Los Angeles is still active. One major mill spokesman calls the San Francisco market "fluid" and feels it should take shape by next week. There's talk that San Francisco prices may rise within the next week or two. Seattle holds unchanged. Los Angeles cast market is softening $1 a ton in the heavy foundries. This is offset somewhat by a reported increase in light foundry activity.



SSW forged ring flanges enable Pfaudler to increase pressure capacities of glass-lined tanks 50%

By switching to Standard Steel forged ring flanges for manholes and larger openings in their glass-lined tanks, The Pfaudler Company, Rochester, N.Y., has increased normal pressure capacities 50% above previous limits. These rolled, weldless flanges replace integral flanges formed in the tank wall or flanges formed from steel plate and welded to the tank shell.

Standard Steel forges these 24″ to 84″ ring flanges to heavier and more efficient shapes than Pfaudler could get previously. An increase in the flat surface area of the flanges permits increased pressures. The switch to forged flanges also has eliminated the serious problem of warping during annealing or stress relief before applying glass linings.

SSW shapes these rings as close as possible to finish dimensions in the rolling operation to minimize the amount of metal removed in roughing and finishing cuts. However, ample material is available for forming a bead on the edge of the flange to retain the clamps which hold the covers tightly on the gaskets.

Pfaudler's use of Standard Steel's weldless flanges is just one of the very diverse ways ingenious users are improving their products by switching to roll forged rings and flanges (12″ to 144″ O.D.). It'll pay you, too, to investigate how they can benefit you. For more facts please write to Department 8616, Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation, Burnham, Pennsylvania.

BALDWIN BLH LIMA-HAMILTON

Standard Steel Works Division

Burnham (Mifflin County), Pa.

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. • Offices in Principal Cities

Scrap Prices *(Effective Feb. 8, 1955)*

Pittsburgh

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles	34.00 to 37.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	18.50 to 19.50
Mixed bor. and ms. turns.	18.50 to 19.50
Shoveling turnings	22.50 to 23.50
Cast iron borings	22.50 to 23.50
Low phos. punch'gs, plate	40.00 to 41.00
Heavy turnings	33.00 to 34.00
No. 1 RR. hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	48.00 to 49.00
RR. steel wheels	41.50 to 42.50
RR. spring steel	41.50 to 42.50
RR. couplers and knuckles	41.50 to 42.50
No. 1 machinery cast.	43.00 to 44.00
Cupola cast	28.00 to 29.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 1 dealers' bundles	34.00 to 35.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	38.00 to 39.00
Low phos. punch'gs, plate	36.00 to 38.00
Low phos. 3 ft and under	35.00 to 37.00
No. 1 RR. hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	40.00 to 41.00
Rerolling rails	50.00 to 51.00
Rails 2 ft and under	47.00 to 48.00
Locomotive tires, cut	34.00 to 37.00
Cut bolsters & side frames	37.00 to 38.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	41.00 to 42.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	44.00 to 46.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast	32.00 to 33.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	35.00 to 36.00
Malleable	43.00 to 45.00
Stove plate	34.00 to 35.00

Philadelphia Area

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	26.50 to 28.00
Machine shop turn.	20.50 to 21.50
Mixed bor. short turn.	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	38.00 to 39.00
Low phos. 2 ft and under	39.00 to 40.00
Low phos. punch'gs	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	35.00 to 36.00
RR. steel wheels	38.00 to 39.00
RR. spring steel	38.00 to 39.00
Rails 18 in. and under	50.00 to 51.00
Cupola cast.	34.00 to 36.00
Heavy breakable cast.	37.00 to 38.00
Cast iron car wheels	41.00 to 42.00
Malleable	41.00 to 42.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	43.00 to 44.00
Charging box cast.	35.00 to 36.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	33.50 to 34.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Cut struct'r'l & plates, 2 ft & under	38.50 to 39.50
Drop forge flashings	33.00 to 34.00
Low phos. punch'gs, plate	33.50 to 34.50
Foundry steel, 2 ft & under	37.00 to 38.00
No. 1 RR. heavy melting	34.00 to 35.00
Rails 2 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	38.00 to 39.00
Malleable	44.00 to 44.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	27.50 to 28.50
Machine shop turn.	20.00 to 21.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. plate	36.00 to 37.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 busheling	31.00 to 32.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	25.50 to 26.50
Machine shop turn.	18.50 to 19.50
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	33.50 to 34.50
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	26.00 to 27.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles, openhearth	28.50 to 29.50
No. 2 bundles	22.00 to 23.00
New busheling	27.00 to 28.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. punch'gs, plate	28.50 to 29.50
No. 1 cupola cast.	.... to 34.00
Heavy breakable cast.	.... to 25.00
Stove plate	.... to 30.00
Automotive cast.	.... to 35.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	15.50 to 16.50
Cast. iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	34.00 to 35.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	45.50 to 46.50
Locomotive tires, uncut	33.50 to 34.50
Angles and splice bars	33.50 to 34.50
Std. steel car axles	34.50 to 35.50
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	33.00 to 34.00
Cast iron brake shoes	29.00 to 30.00
Stove plate	34.00 to 35.00
Cast iron car wheels	34.50 to 35.50
Malleable	35.00 to 36.00
Unstripped motor blocks	32.50 to 33.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	24.00 to 25.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	24.00 to 25.00
Elec. furnace, 3 ft & under	26.00 to 27.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and short turn.	11.00 to 12.00
Shoveling turnings	12.00 to 13.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.50 to 28.50
No. 2 bundles	23.50 to 24.50
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	22.00 to 23.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	28.00 to 29.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	29.00 to 30.00
Bar crops and plate	33.00 to 34.00
Structural and plate, 2 ft.	33.00 to 34.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	37.00 to 38.00
Rails, 18 in. and under	41.00 to 42.00
Angles & splice bars	38.00 to 39.00
Rerolling rails	42.00 to 43.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.50 to 36.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos., 18 in. & under	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	....	$24.00
No. 2 hvy. melting	....	20.00
No. 1 bundles	....	23.00
No. 2 bundles	....	18.00
No. 3 bundles	....	14.00
Machine shop turn.	....	6.00
Cast iron borings	....	9.00
No. 1 RR. hvy. melting	....	24.00
No. 1 cupola cast.	....	40.00

Los Angeles

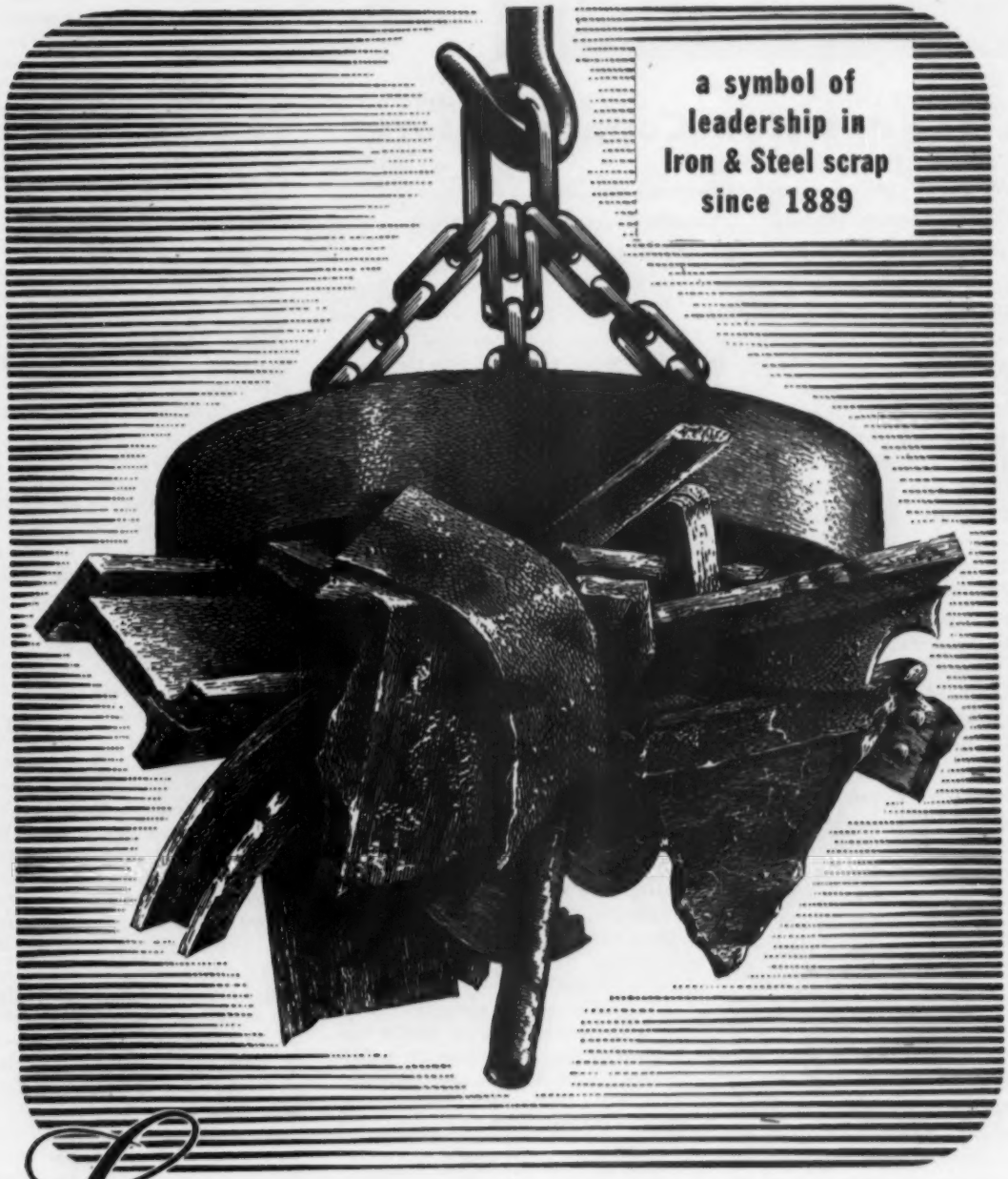
No. 1 hvy. melting	....	$25.00
No. 2 hvy. melting	....	24.00
No. 1 bundles	....	27.00
No. 2 bundles	....	22.00
No. 3 bundles	....	18.00
Machine shop turn.	....	8.00
Shoveling turnings	....	10.00
Cast iron borings	....	10.00
Elec. furn. 1 ft. and under.	....	28.00
No. 1 RR. hvy .melting	....	28.00
No. 1 cupola cast.	$41.00 to	42.00

Seattle

No. 1 hvy. melting	....	$25.00
No. 2 hvy. melting	....	25.00
No. 1 bundles	....	21.00
No. 2 bundles	....	18.00
No. 3 bundles	....	14.00
No. 1 cupola cast.	....	35.00
Mixed yard cast.	....	25.00

Hamilton, Ont.

No. 1 hvy. melting	....	$32.00
No. 2 hvy. melting	....	29.00
No. 1 bundles	....	32.00
No. 2 bundles	....	26.00
Mixed steel scrap	....	26.00
Bushelings	....	27.00
Bush., new fact prep'd	....	30.00
Bush., new fact unprep'd	....	26.00
Short steel turnings	....	12.00
Mixed bor. and turn.	....	12.00
Rails, rerolling	....	41.00
Cast scrap	$42.00 to	45.00



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U. S. Bans New Copper Export

Government cuts off export of primary copper . . . Cut scrap exports sharply . . . London copper hits new highs . . . Rhodesian production at 40 pct—By R. L. Hatschek.

◆ MADNESS is almost the best term to describe the copper situation this week. Copper prices in London have skyrocketed to new alltime highs with daily frequency and at the end of last week—even before the U. S. government slapped a ban on new copper export and sharp limits on scrap export—English buyers were willing to pay the equivalent of 44.25¢ per lb for the red metal.

Also preceding the issuance of the order, several foreign legations had protested the idea that the U. S. would slap on such curbs. But Washington went ahead with it.

Another proposal — which may still come in for some more plugging—was that stockpile copper be released to ease the situation. Again the question is brought up: What's the stockpile for? Most members of the trade will be quick to agree that this is an emergency even though no military emergency.

But with the threat of war over Formosa looming, the government is even more reluctant than usual to part with any strategic copper.

There's still a chance that sanity can be regained if Rhodesian production snaps back fast enough and there are no other serious dislocations.

Meanwhile, hard-pushing copper consumers are watching their inventories fade rapidly.

COPPER . . . A new government order bans the export of domestic copper and sharply limits the export of copper scrap. Bureau of Foreign Commerce of the Commerce Dept. issued the order, making it effective Feb. 5, in an attempt to ease the domestic supply situation.

February and March quotas established by the order limit export of pure copper scrap to 6000 tons and copper content of alloy scrap to a like 6000 tons. Re-export of refined copper produced from foreign origin materials will continue without quota restrictions, subject only to licensing requirements already in effect.

Anticipation of this move, which was freely mentioned as a possibility when export licenses were held up, had already caused a skyward spiral in London prices. This soared to 44.25¢ per lb for spot copper last Friday, before the export limit was announced. And this was despite reports that the Rhodesian strike was "officially" over and that production there was at about 40 pct of normal.

To say that the market here remains torrid is pretty much of an unnecessary understatement. There is even some speculation that a further price rise will be necessary. Producers are hoping they won't be forced into this and they are pinning their hopes on a quick return to normal in Rhodesia.

It is notable in the remelt market, that the sole ingot maker that held to earlier prices in the face of the last increase withdrew its selling prices pending clarification of the picture regarding export of copper.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Feb. 2	Feb. 3	Feb. 4	Feb. 5	Feb. 7	Feb. 8
Copper, electro, Conn.	33.00	33.00	33.00	33.00	33.00	33.00
Copper, Lake, delivered	33.00	33.00	33.00	33.00	33.00	33.00
Tin, Straits, New York	90.125	90.75	91.50	....	90.75	90.75*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

ALUMINUM . . . Military needs of aluminum during the second quarter of 1955 will amount to 77,500 tons, says Business and Defense Services Administration. This is 2500 tons less than first quarter reserves for defense and atomic energy requirements. The agency says the reduction in "take" reflects a change in military requirements. This amounts to 15 pct of total domestic and imported supply as compared to 17 pct in the current quarter.

It won't faze the booming market, though. Aluminum producers report healthy buying, and there's even a tinge of scare in some segments of the market. It's felt, however, that this is unreasonable unless a real war breaks out.

Even so, lawmakers last week introduced a bill in Washington which would eliminate import tariffs on raw aluminum for one year.

Scrap and secondary aluminum ingot prices are continuing their upward march with some ingot quotations now fully 5¢ per lb higher than they were 6 weeks ago. Scrap dealers are now quoting buying prices of 13¢ to 13½¢ per lb for old sheet and miscellaneous castings.

LEAD, ZINC . . . More words were added to the "boost tariff" statements when Rep. Henry A. Dixon (R., Utah) told the House Ways and Means Committee that the Administration's policy is still hurting lead and zinc miners. He said the vast majority of Utah's lead and zinc mines have not been able to reopen under the President's stockpiling program.

His recommendation is to modify the Reciprocal Trade Act by including either higher lead-zinc import duties or some sort of sliding scale tariffs as frequently proposed by some members of the industry.

Meanwhile, zinc demand continued at a good clip, though not quite as hot as a week or two ago. Buyers, realizing that a price increase is easily possible, show definite preference for flat price deals.

The London market is likewise strong, ending last week at a price about 0.75¢ per lb higher than parity with New York.

Lead sales have definitely perked up and tonnages moving last week totaled over 15,000 tons—as they had in the week before. Here, too, consumer preference is for purchases to be made on a flat price basis. And London prices are nearly 0.25¢ per lb higher than their New York equivalents.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.8¢ to $1.97.

Red, Round: Rolled, 1.064-4-5 in. 1100-F, 43.6¢ to 46.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ½-11/32 in., 63.5¢ to 50.1¢; ⅝-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.3¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.3¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.5¢ to 49.3¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42⅝ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 39.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 67¢; ½ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ⅝ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.50 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ⅞ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1⅝ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $11; Bar, HR or forged, $9; Forgings, $9.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks	...	65	...

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	49.79	....	51.86
Copper, h-r	51.76	48.11	....
Copper, drawn	....	49.36	....
Low brass	47.35	47.29	....
Yellow brass	44.27	44.21	....
Red brass	48.44	48.38	....
Naval brass	....	42.49	43.75
Leaded brass	44.27	35.36	41.41
Com. bronze	50.08	50.02	....
Mang. bronze	....	46.02	47.58
Phos. bronze	70.12	70.62	....
Munts metal	....	42.15	43.40
Ni silver, 10 pct	58.25	60.58	....

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.
- Strip $1.71
- Rod, bar, wire 1.68

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 23.20
Aluminum pig 21.50
Antimony, American, Laredo, Tex. .. 25.50
Beryllium copper, per lb cont'd be. $40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $72.75
Bismuth, ton lots $2.25
Cadmium, del'd $1.70
Cobalt, 97-99% (per lb) ... $2.60 to $2.67
Copper, electro, Conn. Valley 23.00
Copper, Lake, delivered 23.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.8%, dollars per troy oz. .. $2.25
Iridium, dollars per troy oz. .. $110 to $120
Lead, St. Louis 14.80
Lead, New York 15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 27.00
ingot 27.75
Magnesium, sticks, 100 to 500 lb, 46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $323 to $324
Nickel electro, f.o.b. N. Y. warehouse 67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. .. $18 to $20
Platinum, dollars per troy oz. .. $82 to $84
Silver, New York, cents per troy oz. 85.25
Tin, New York 90.75
Titanium, sponge, grade A-1 ..... $4.50
Zinc, East St. Louis 11.50
Zinc, New York 12.00
Zirconium copper, 50 pct $6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
- No. 115 ..... 33.00
- No. 120 ..... 32.50
- No. 123 ..... 32.00

80-10-10 ingot
- No. 305 ..... 37.00
- No. 315 ..... 34.75

88-10-2 ingot
- No. 210 ..... 45.75
- No. 215 ..... 42.25
- No. 245 ..... 37.75

Yellow ingot
- No. 405 ..... 28.75

Manganese bronze
- No. 421 ..... 30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper, max. 27.50-28.00
- 0.60 copper max. 27.25-27.75

Piston alloys (No. 122 type) .. 26.50-27.25
No. 12 alum. (No. 2 grade) ... 25.75-26.25
108 alloy 26.50-27.00
195 alloy 26.50-27.50
13 alloy (0.60 copper max.) ... 27.25-27.75
ASX-679 ..... 26.50-27.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½% 27.25-28.25
Grade 2—93-96% 26.25-27.25
Grade 3—90-92% 25.50-26.50
Grade 4—85-90% 24.75-25.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper
- Cast, oval, 15 in. or longer 44.92
- Electrodeposited 39.78
- Flat rolled 45.42

Brass, 80-20
- Cast, oval, 15 in. or longer 43.515

Zinc, flat cast 20.25
- Ball, anodes 18.50

Nickel, 99 pct plus
- Cast 90.50*

Cadmium $1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn. 94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63.00
Copper sulphate, 99.5 crystals, bbl 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 31.25*
Nickel chloride, 300 to 400 lb 43.50*
Silver cyanide, 100 oz. lots, per oz. 75⅛
Sodium cyanide, 96 pct domestic
- 200 lb drums 19.25

Zinc cyanide, 100 lb drum 54.30

*Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	21⅞	20⅞
Red brass	25⅛	24⅝
Comm. bronze	26⅛	25⅛
Mang. bronze	20⅝	19⅛
Yellow brass rod ends	21⅝	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 32
No. 2 copper wire 30⅛
Light copper 29
*Refinery brass 27⅛

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30½—31
No. 2 copper wire	29 —29⅛
Light copper	27½—28
No. 1 composition	26
No. 1 comp. turnings	25½
Rolled brass	20 —20½
Brass pipe	20⅝—21
Radiators	20½—21

Aluminum

Mixed old cast	16 —17
Mixed new clips	17½—18½
Mixed turnings, dry	16 —17⅛
Pots and pans	16 —17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	28½—29
No. 2 heavy copper and wire	27½—28
Light copper	26 —26½
New type shell cuttings	26 —26½
Auto radiators (unsweated)	18½—19
No. 1 composition	23 —23⅛
No. 1 composition turnings	22½—23
Unlined red car boxes	19½—20
Cocks and faucets	19½—20
Mixed heavy yellow brass	16½—17
Old rolled brass	18 —18⅛
Brass pipe	19½—20
New soft brass clippings	21
Brass rod ends	19
No. 1 brass rod turnings	18

Aluminum

Alum. pistons and struts	10 —11
Aluminum crankcases	13 —13½
1100 (2S) aluminum clippings	16
Old sheet and utensils	13 —13½
Borings and turnings	8 — 9
Misc. cast aluminum	13 —13½
2024 (24S) clippings	14½—15

Zinc

New zinc clippings	7
Old zinc	5¼
Zinc routings	3½— 3¾
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	57 —60
Clean nickel turnings	40 —43
Nickel anodes	57 —60
Nickel rod ends	57 —60
New Monel clippings	25 —26
Clean Monel turnings	20 —21
Old sheet Monel	23 —24
Nickel silver clippings, mixed	16 —17
Nickel silver turnings, mixed	14 —15

Lead

Soft scrap lead	11½—11⅝
Battery plates (dry)	6 — 6¼
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17⅛—18

Miscellaneous

Block tin	70 —75
No. 1 pewter	50 —55
No. 1 auto babbitt	45
Mixed common babbitt	12 —12⅛
Solder joints	17
Siphon tops	45
Small foundry type	16½—16⅝
Monotype	15 —15½
Linotype and stereotype	14½—14⅝
Electrotype	12½—12⅝
Hand picked type shells	10½—10⅝
Lino. and stereo. dross	4½
Electro dross	5

IRON AGE

STEEL PRICES

(Effective Feb. 6, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *B3,R7*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					3.95 *P2*		3.95 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Bridgeport, Wallingford, Conn.	$60.00 *N8*	$83.00 *N8*						4.35 *N8*	6.20 *W1*			7.00 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R5, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4 W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *P6*	5.75 *B4,J3*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.45 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*		4.30 *S2*		6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.00 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Tex.		$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*		4.30 *S2*		6.40 *S2*		6.95 *S2*	

IRON AGE

STEEL PRICES

(Effective Feb. 8, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & heavier	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1,R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4,R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*						
	Newport, Ky.	4.05 *N5*	4.95 *N5*	5.45 *N5*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1,Y1*	4.95 *I3, U1,Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3,Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.80 *I3, U1,Y1*	$7.50 *I3, U1,Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
	Niles, Ohio Sharon, Pa.	4.05 *S1,R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3*	6.725 *N3*	5.85 *N3*	6.10 *S1,R3*	7.50 *R3*				$8.80 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1,P6*	4.95 *J3, U1,P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.875 *P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5,F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.80 *W3, W5*	$7.50 *W3, W5*	6.20 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*												
	Kansas City, Mo.										4.925 *S2*			
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Texas										4.925 *S2*			

† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box.

* COKES: 1.50-lb. add 25¢.

ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.

IRON AGE

STEEL PRICES

(Effective Feb. 8, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'rs. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B5*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Centreville, Pa.							4.225 *L4*		5.80 *L4*	6.45 *L4*	
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							3.975 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Bridgeport, Putnam, Conn.	4.55 *N8*		5.95 *W10*	5.225 *N8*			4.475 *N8*				
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R3, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3*	4.30 *N4,R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I3,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5* 6.645 *C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R5*		5.40 *R5* 5.60 *B5,P8* 5.85 *P3*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3, P8*	6.55 *G3*	4.225 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3*	5.075 *I3, U1, Y1*	6.625 *M5, R3*	6.45 *U1, I3, Y1*	4.225 *I3, U1, Y1*	5.275 *I3*	5.80 *U1, Y1*	6.45 *U1, I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3, W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1, Y1, C10,R3*	4.30 *U1, Y1, R3*	5.40 *F2, Y1, C10*	5.075 *U1, Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1, Y1*	4.225 *U1, Y1, R3*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.85 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.00 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.95 *S2*	6.50 *S2*	6.00 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Burmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	W4.5	13.75	W6.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. *L2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers discount, 5 pct.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Feb. 8, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *UI*	4.45	5.35	5.425				
So. Chicago *R3*				7.30			
Ensley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *UI*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *UI*		5.35	5.425				
Kansas City *S2*				7.30			11.50
Lackawanna *B3*	4.45	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.85	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P5*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.60		5.425	12.00
Steelton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Torrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R5*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R5*); Zanesville (*A7*).

*Coils 75¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*35.50	
Washington, Pa., *J2*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	39.50	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire* Galv.
	Col	Col	Col	Col	¢/lb.	¢/lb.	¢/lb.
Alabama City *R3*	137	146	...	155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149	...		156	6.90	7.425
Atlanta *A8*	139	151	...	157	164	7.00	7.525
Bartonville *K2*	139	151	...	157	164	7.00	7.55
Buffalo *W6*						6.90	7.30
Chicago, Ill. *N4*	137	149	...	155	162	6.90	7.45
Cleveland *A6*	142	...	...	...	...	...	.....
Cleveland *A5*	...	...	...	...	...	6.90	.....
Crawfordsville *M4*	139	151	...	157	159	7.00	7.55
Donora, Pa. *A5*	137	146	...	155	159	6.90	7.30
Duluth *A5*	137	146	150	155	159	6.90	7.30
Fairfield, Ala. *T2*	137	146	...	155	159	6.90	7.30
Galveston *D4*	139	...	...	...	...	...	.....
Houston *S2*	142	154	...	...	164	7.30	7.70
Johnstown, Pa. *B3*	137	149	...	...	162	6.90	7.45
Joliet, Ill. *A5*	137	146	...	155	159	6.90	7.30
Kokomo, Ind. *C9*	139	148	...	157	161	7.00	7.55
Los Angeles *B2*	...	...	...	...	...	7.85	.....
Kansas City *S2*	142	158	...	167	164	7.50	7.90
Minnequa *C6*	142	151	155	160	164	7.15	7.55
Monessen *P6*	137	151	...	...	163	6.90	7.45
Moline, Ill. *R3*	...	...	145	...	...	...	.....
Pittsburg, Cal. *C7*	156	169	...	179	179	7.85	8.25
Portsmouth *P7*	...	...	...	...	...	6.90	7.90
Rankin, Pa. *A5*	137	146	...	...	159	6.90	7.30
So. Chicago *R3*	137	146	145	155	159	6.90	7.30
S. San Francisco *C8*	...	...	...	...	179	...	.....
Sparrows Pt. *B3*	139	...	...	157	164	7.00	7.55
Struthers, O. *Y1*	...	...	...	...	...	6.90	7.55
Worcester *A5*	143	...	...	...	...	7.20	.....
Williamsport, Pa. *S5*	...	...	150	...	...	...	.....

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra Galvanized products computed with zinc at 11.0¢ per lb

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: As rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.22	7.51	7.78	6.89	.....	6.57	6.92	6.68	8.52	.....	.....	.....	.....
Birmingham	.15	6.35–6.50	7.35–8.10	8.25–9.00	6.60	9.80	6.65	6.65	6.50	9.00	.....	.....	.....	.....
Boston	.10	7.23	8.23	9.42–9.52	7.47	9.65–9.85	7.34–7.37	7.49	7.20	8.60–8.70	12.60–12.80	12.60	15.15	15.25
Buffalo	.20	6.35–6.40	7.40[3] 7.45	8.00–8.04	6.70–6.75	.....	6.65–6.70	6.70–6.77	6.50–6.55	7.85[3] 7.90	12.50	12.30	14.85	14.90[3]
Chicago	.20	6.30	7.30	8.30	6.62	.....	6.52	6.60	6.51	7.50	12.25	12.05	14.60	14.70
Cincinnati	.15	6.49–6.53	[3]7.37–7.42	8.25–8.30	6.86–6.91	.....	6.61–6.66	6.91	6.75–6.80	7.80–7.85	12.55	12.35	14.90	15.00
Cleveland	.20	6.38	7.38	8.25	6.72	.....	6.60	7.02	6.57	7.60	11.96	12.11	.....	14.76
Denver	.....	8.15	9.15	10.37	8.40	.....	8.10	8.15	8.30	9.27	.....	.....	.....	16.30
Detroit	.20	6.57	7.57	8.50–8.55	6.90	.....	6.90–6.95	7.16	6.79	7.77	12.45	12.35	14.80	14.90
Houston	.20	7.35	7.80	9.93	7.70	.....	7.35	7.60	7.70	9.50	.....	13.10	.....	.....
Kansas City	.20	7.05	8.05	8.95	7.29	.....	7.19	7.36	7.18	8.07–8.27	.....	12.27	.....	.....
Los Angeles	.30	7.50	9.35	9.95	7.85	.....	7.45	7.65	7.45	10.15	.....	13.35	.....	16.50
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	8.24	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21–8.30	6.71	.....	6.61	6.86	6.60	7.69	12.34	12.14	14.69	14.79
New Orleans	.15	6.70	7.65	9.23	6.90	.....	6.90–6.95	7.05	6.80	8.70–10.70	.....	.....	.....	.....
New York	.10	6.97–6.98	7.78–8.46	8.79[1] 8.99	7.36–7.56	.....	7.18–7.27	7.13–7.38	7.30–7.37	8.63–8.73[3]	12.63	12.43	.....	15.08
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.29[3]	8.00[4] 8.23	6.96	.....	6.69	6.54	6.74	8.19[3]	.....	11.66–12.21	.....	14.66
Pittsburgh	.20	6.38	7.38	8.30–8.50	6.72–6.75	.....	6.52	6.69	6.51	7.85	12.25	12.05	14.60	14.70
Portland	.20	7.60	6.75	9.05	7.65	.....	7.45	7.50	7.55	10.95	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70–8.85	8.80	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.95	9.35–9.85	7.80	.....	7.40	7.50	7.35	10.05	.....	13.35	.....	16.50
Seattle	.00	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.80	.....	16.45
St. Louis	.20	6.62–6.67	7.67	8.54–8.59	6.91	.....	6.81	7.09	6.80	7.89	12.54	12.34	14.84–14.89	14.99
St. Paul	.15	7.03	8.03–8.58	8.96	7.28	.....	7.19	7.35	7.16	8.26	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (4) 1000 lb or over. (5) $.25 delivery. (6) 1000 to 1999 lb, $.25 delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, New Britain, Conn. *N8*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	.....
Detroit *D2*	5.85	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.73
Oil hardened manganese	.405
Special carbon	.37
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24 in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50

6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less ..... $129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	29.80	40	100, 110	8.95
20	72	29.00	35	110	8.95
12 to 18	72	28.80	30	110	8.95
7 to 16	60	21.00	24	72 to 84	9.10
8	60	23.25	20	90	8.95
4	40	28.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	16, 12	60	10.30
2	24	43.80	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	Discount C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1⅛" inclusive	58	66
1¼" to 1½" inclusive	60	67½

C.P. Hex regular & hvy.

All sizes	55	64

Hot Galv. Nuts (all types)

¾" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	Discount H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

* Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Discount Stove Bolts
Packaged, package list		33	43
Bulk, bulk list			
¼-in. diam. & under	15,000- 99,999	59	17
	100,000-199,999	63	25
	200,000 & over	67	33
5/16-in. diam. & larger	15,000- 49,999	59	17
	50,000- 99,999	63	25
	100,000 & over	67	33
All diam. over 3 in. long	5,000- 49,999	59	..
	50,000- 99,999	63	..
	100,000 & over	67	..

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Discount Square
Packaged, package list		30	33
Bulk, bulk list			
⅜-in. diam. & smaller	15,000- 99,999	15	17
	100,000-199,999	23	25
	200,000 & over	31	33

REFRACTORIES

Fire Clay Brick — *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	23.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick — *Per net ton*

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite — *Bt. ⅝-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.06
in sacks	43.75

Dead Burned Dolomite — *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; effective CaF₂ content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.5+% Fe	83.0¢ to $1.43
Aluminum	31.5¢
Brass, 10 ton lots	39.50¢ to 56.50¢
Copper, electrolytic	42.50¢
Copper, reduced	42.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	67.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective Feb. 6, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C	36.00	0.15% C ... 33.75
0.025% C, Simplex	34.50	0.20% C ... 33.50 0.50% C ... 33.25
0.06% C	34.50	1.00% C ... 33.00
0.10% C	34.00	2.00% C ... 32.75

65-69% Cr, 4-9% C 34.75
62-66 Cr, 4-6% C, 0.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.35

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.35¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.20
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 43 to 53%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn:

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.25¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.35	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $56.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $58.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.38

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.... $6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Sigio, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $3.30

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.37
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.34

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 314%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

Silcaz, contract basis, delivered.

Ton lots	45.00¢

Standard 13 ft. Wire Mesh Welding Machine

Sixty Cross Wires per minute . . . 2" Min. to 12" Max. Spacings . . . Easily Adjusted Cross Wire and Longitudinal Wire Spacing . . . Hand-Started Pattern not required to start New Mesh Pattern . . . Cross Wire may be Pre-Straightened and Hand-Loaded or Automatically loaded with Cross Wire Feed Accessory . . . **Accessories Available:** Cross Wire Feed, Take-up Mandrel, Longitudinal Wire Straightener . . . (Three Handwheels Adjust All Longitudinal Wire Straightener Rolls in Unison.)

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Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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170 YORK AVENUE • PAWTUCKET • RHODE ISLAND

*Certified by the U. S. Air Force

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END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

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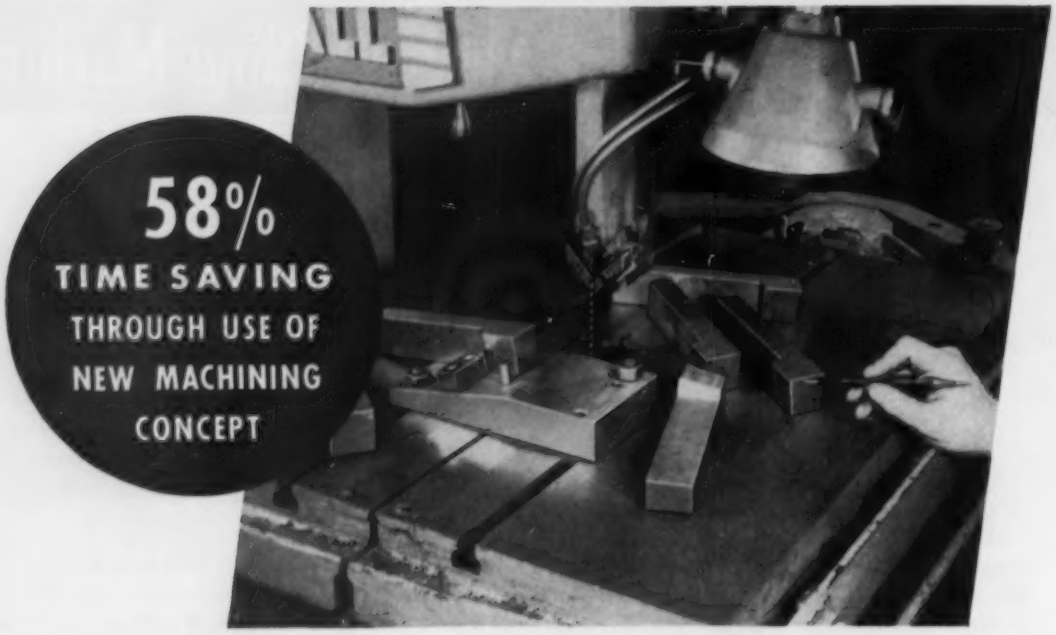
STRIP, COILED
WIRE, COILED
ACCURATELY ROLLED FOR
ELECTRIC FUSE ELEMENTS
EYELETS—BRASS, STEEL AND ZINC
THE PLATT BROS. & CO., WATERBURY, CONN.



Mass Production Band Machining is Industry's Newest Cost Reducer

*Band Machining

B/M* Bonus Cutting Tools Cost Less

The thin machining band used on a DoALL has an average of 1,500 cutting teeth. It cuts continuously. Compare this with cutting tools used in other machines. They carry one or only a few cutting points. They are far more costly tool carriers. When you machine it with a saw band you can greatly reduce machining costs.

THE carbide tool shank shown above was once formed the "conventional" way. Then, a DoALL man explained the cost-reducing opportunities presented by production band machining. Now the operation is performed in less than half the previous time.

The modern DoALL production band machine has a hydraulic power-feed table which carries the work into the continuous-cutting band tool. It has a recirculating coolant system to promote high cutting rates. Fixturing is extremely simple because it is only necessary to hold the piece on the table to accomplish the machining operation.

Tool cost is lower, set-up time is less, loading, and unloading time is reduced. The capital investment in the machine is ⅓ to ½ that of other machine tools. And, it is far more versatile because of the "non-restricted geometry" of cutting at any angle in any direction.

This is the new concept in machining. By applying production band machining in your plant you can secure cost savings that will quickly pay for your DoALL. SEE IT IN ACTION. Call your local DoALL store (see classified directory) or write The DoALL Company for a free demonstration at your plant.

DoALL

NEW COLOR FILM—"Production Band Machining" now available showing operation of this new machining concept.

PB-10

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Personalized Service...Complete Stocks...Local Delivery

EDUCATIONAL STUDY WALL CHARTS

Economic Principles

$1.00 each postpaid

Lower quantity prices

Polyken

CONTROLLED STRENGTH **TAPES**

GIVE TOOLS THE BEST PROTECTION WITH THE LEAST AMOUNT OF TAPE

Here's protection you couldn't get with ***twice*** *as much paper tape*

Polyken *can cut your tape costs* because, with *Polyken*, the work can often be done with shorter lengths or narrower widths of tape.

The mill cutter you see in the photograph has a tough sheath of *Polyken* Tape that protects the sharpened edges of the tool. This sheath conforms to the irregular shape of the cutter, provides abrasion resistance, and pulls off clean when the tool is used. But with paper tape, you'd have to use at least twice as much. Even then, you'd merely be covering the cutter, not really protecting it.

Polyken Tapes have the *controlled strength* to do this job without waste. That controlled strength is produced by combining the right pressure-sensitive adhesive with a cloth backing. Cloth—because cloth backing has much greater abrasion resistance and almost twice the tensile strength of an equal width and length of paper backing.

Use *Polyken* controlled strength Tapes to cut your tape costs. Send in the coupon for complete information.

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Polyken Products Department of The Kendall Company

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Please send me physical properties and further information on *Polyken* Controlled Strength Tapes, and a copy of your Tape Use Manual.

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you should have these new Cleveland catalogs

SEND FOR YOUR COPIES TODAY!

(Please write on your company letterhead.)

- VERTICAL OPEN GAP PUNCHES and SHEARS
- HORIZONTAL PUNCHES
- ANGLE SHEARS
- BAR SHEARS
- BENDING ROLLS
- STRAIGHTENING ROLLS
- BENDING and STRAIGHTENING MACHINES
- ROTARY PLANERS
- WALL RADIAL DRILLS

FABRICATING TOOL CATALOG No. 9

Just completed, this catalog illustrates and describes the various types of Cleveland machines used in the fabrication of plates, bars, angles, beams, girders and other structural shapes.

Should you desire additional information on any of the machines you'll find in this book, we'll gladly furnish you with it promptly.

PUNCH and DIE CATALOG No. 12

Here you'll find a description of the Cleveland System of Standardization which allows you to use economical standard rather than costly special punches. Its outline of the proper care of punches and dies will help reduce your replacement cost. It lists and illustrates all standard and special Cleveland Punches and Dies available for every make of punching machine and press. AA-977

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YEARS OF MACHINE TOOL PROGRESS

Diamond Anniversary

We take pride in our 75 years of machine tool building. We believe that our years of experience assure you of the utmost in dependable and economical performance from every Cleveland machine whether special or standard.

THE CLEVELAND PUNCH & SHEAR WORKS CO.

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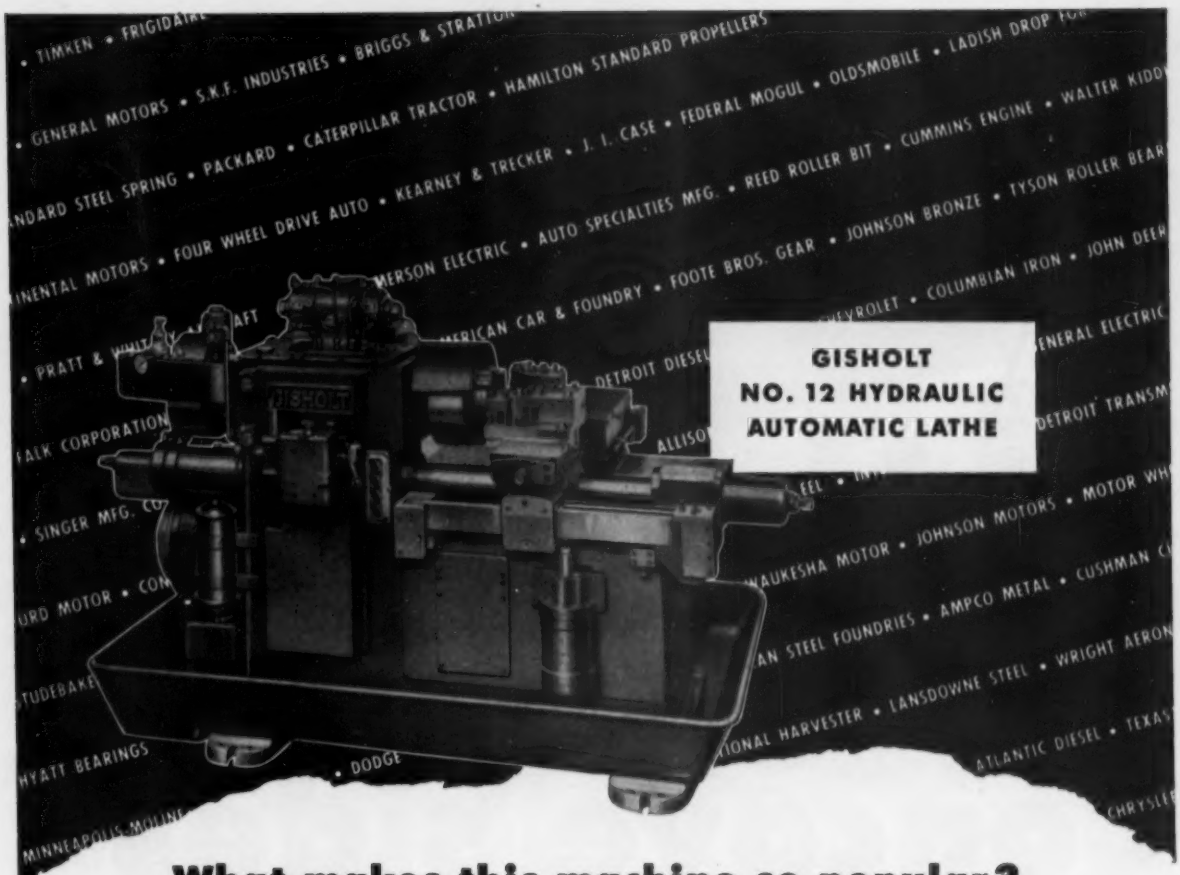
CITY FOUNDRY DIVISION · SMALL TOOL DEPARTMENT



What makes this machine so popular?

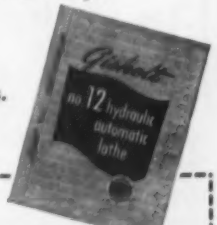
It's the simple basic application of hydraulic principles—perfected through the years. It's a single spindle machine that handles all classes of work—holding with a chuck or an arbor, with fixtures, or with a work driver for between centers. Front carriage alone will perform 14 different cycles. Independent rear slide can be positioned at any angle to the work. Feeds are infinitely adjustable...not limited by cams. Here's the versatility, the speed, the automatic cycle, and the easy change-over that mean big savings for scores of users. Why not for you?

If you have parts up to 12″ to produce at lower cost, look at the Gisholt No. 12 Hydraulic Automatic Lathe. Call your Gisholt representative. Or write us.

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

This new catalog will show you why.

All operating features are clearly described, fully illustrated. Here, too, are 28 different jobs to show many classes of work and tooling possibilities. Write for your copy.



Gisholt Machine Company
Madison 10, Wisconsin

Please send my copy of the catalog describing the Gisholt No. 12 Hydraulic Automatic Lathe.

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MACHINE COMPANY
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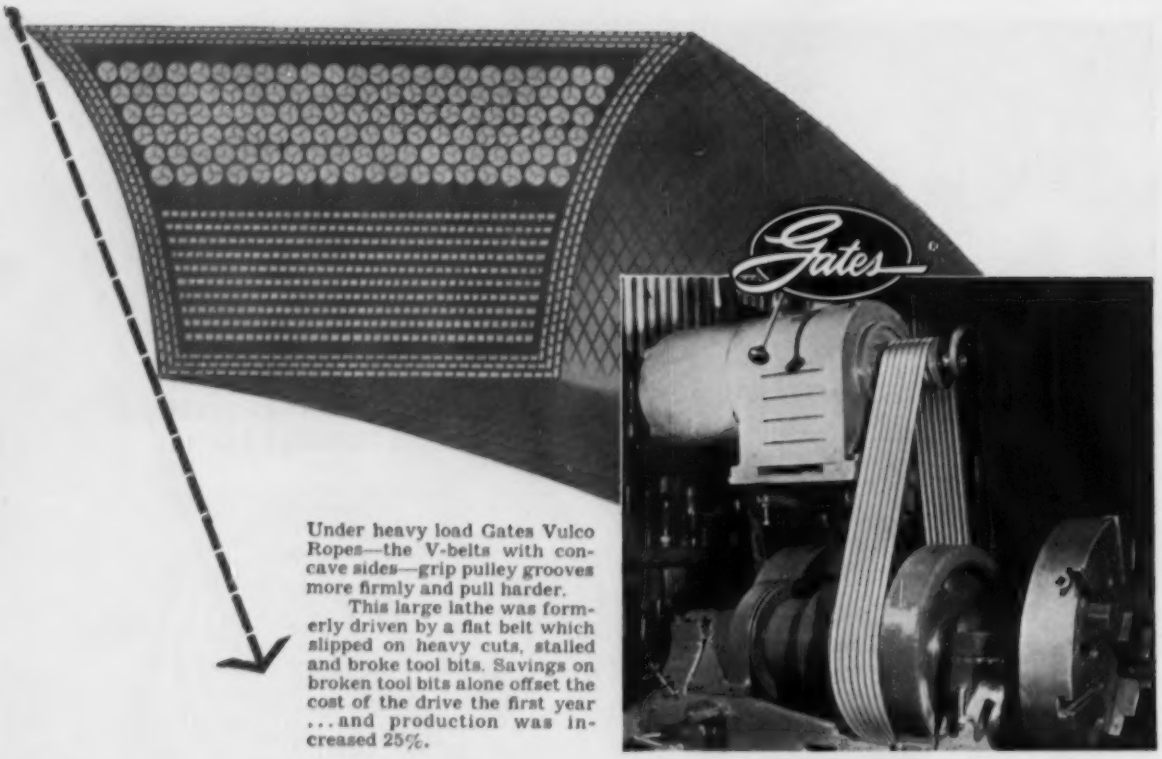


Under heavy load Gates Vulco Ropes—the V-belts with concave sides—grip pulley grooves more firmly and pull harder.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year ...and production was increased 25%.

Concave sides keep belt costs down!

Industry is saving thousands and thousands of dollars every year by specifying Gates Vulco Ropes—the V-Belts with *concave sides* (U.S. Pat. No. 1813698).

Here's the interesting reason *why* Gates belts save money:

On the bend around the sheave the *precisely engineered* concave sides (Fig. 1) of the Gates belt fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley. That means sure pulling power and *even distribution of wear.* Longer wear, fewer replacements cut belt costs...reduce down time...contribute to profits.

Simple test proves value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. The bulging sides prevent the belt from fitting evenly in the pulley groove (Fig. 2-A). Uneven contact causes uneven wear...shortens belt life...increases costs.

Keep belt costs *down* by specifying Gates Vulco Rope Drives—the V-Belt with *concave sides.* Belts you need are readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 25-A

GATES VULCO ROPE DRIVES

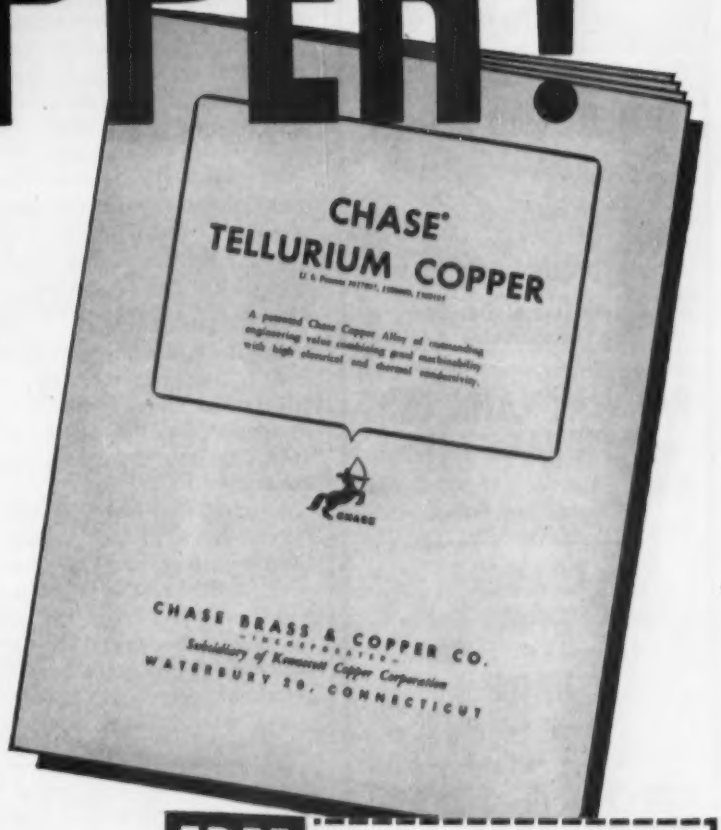
TELLURIUM COPPER!

Has high conductivity, good machinability... saves production time!

Chase Tellurium Copper gives you the advantages of high conductivity *plus* good machinability.

Chase Tellurium Copper can be machined with tool speeds and settings similar to those used with Free-Cutting Brass, permitting high rates of production. But, unlike Free-Cutting Brass, Chase Tellurium Copper can be *hot worked* easily, and can be cold worked almost as extensively as pure copper.

For more information on Chase Tellurium Copper, check the coupon below.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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Launch Rebuild Program . . . A dealer in used and rebuilt steel mill equipment has launched a warehousing and rebuilding program to assure ready availability of machinery for prospective buyers.

Albert Curry & Co., announced that it is building an inventory of mill equipment at its warehouse in the Pittsburgh district. After receipt, the machinery is cleaned and rebuilt on a contract basis.

Albert Curry, president, believes the program will prove of benefit to buyers and at the same time eliminate the inconvenience and expense of traveling to steel plants to view equipment.

At present the company is stocking lighter equipment such as shears and straightening presses, but may also stock warehouse and rebuild some rolling mills.

Mill Equipment Slow . . . Meanwhile, the mill equipment business is dull. Dealers report little or no interest in heavy mills. Lighter equipment, while more active, definitely is in need of a shot in the arm.

A bright spot in the Pittsburgh district is the pickup in electrical equipment demand. This improvement first became apparent in mid-December. Following a holiday slump, the upward trend was resumed. Principal demand is for generators for diesel engines used in coal mine haulage systems.

Government Contracts Help . . . A secondary spur is being provided by government sub-contracts for aircraft and atomic energy applications. Out-of-area buying is accounting for bulk of the improvement district mills and coal mines are largely out of the market.

Machine tool market is quiet. Inquiries are few and far between. Dealers believe an improvement will materialize by second quarter but nothing in sight as yet.

Cranes Improve . . . The crane business has felt a mild improvement. Inquiries are plentiful, particularly from the South, where an unidentified company is searching for a 250-300 ton crane for general purpose duty. Used crane supply is described as scarce. One dealer has a good prospect for a 50-ton trolley crane, but is having trouble turning one up.

Railroads Might Buy . . . More optimistic talk by the railroads also is encouraging. One large line recently announced that it plans to step up its maintenance work which lagged badly during the period when carloadings were depressed. This could mean a pickup in demand for machine tools of various kinds.

The trade in Pittsburgh is realistic enough, however, to look for no easing in competition or bargain-hunting. While there is less quibbling today over prices than there was during most of 1954, the customer is still in position to more or less call his shots on what he considers to be a fair price for a piece of equipment.

Optimism In Chicago . . . Used machinery dealers in the Chicago area have been encouraged by recent increase of inquiries and actual sales, and are setting their sights higher for the coming year. Some capital expansion dollars still hanging over from plans abandoned in early 1954 may still shake loose. There have been a scattering of small purchases apparently aimed at setting up pilot production lines, and the buyers indicate that if these skeleton lines show promise, they will bring more purchases later this year. This isn't a factor that is going to make a strong show in used tool sales, but is another of the reasons more dealers are seeing a brighter 1955.

Basically, there's only one reason for the higher hopes. Business is a little better for everybody.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
8' x ¾" Bertsch Initial Type Bending Roll—LATE
8' x ½" Bertsch Initial Type Bending Roll
10' x ¾" Bertsch Initial Type Bending Roll
20' x 1" Hilles & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Size 186
10' x ¾" Dreis & Krump Size 260
12' x ¾" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
Series 330 Cincinnati, Forming Capacity 11'9"x¼"
Model B-178 Verson All Steel, Capacity 12'x¼"

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H Trav-Lift	28' Span 220/440 A.C.
3 ton P&H Trav-Lift	28' Span 440 Volt A.C.
5 ton P&H	50' Span 220/3/60 A.C.
7½ ton Shepard-Niles	22' Span 220/3/60 A.C.
10 ton Shepard-Niles	45' Span 230 Volt D.C.
10 ton Harnischfeger	50' Span 220/3/60 A.C.
15 ton OET	45' Span 230/3/60 A.C.
15 ton Case	80' Span 230 Volt D.C.
15 ton P&H	97' Span 115 Volt D.C.
With 250/440 AC Generator Set	
38 ton Whiting	40' Span 225 Volt D.C.
50 ton Niles	60' Span 220/3/60 A.C.
125 ton Cleveland	63' Span 220 Volt D.C.
With 2 Trolleys 62½ ton & 10 ton Aux.	

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Taylor Wilson Cut-off Machine, Capacity 2¾" to 6¾" Complete with Hydr. System & Elect. Equip.

DRAW BENCHES
85,000 McKay Chain Draw Bench, 41' Length of Draw
100,000# Poole Draw Bench, Max. length of bar 39' With draw up to 4½" max. round

FORGING MACHINES
1" 1¼" Acme
1" 1¼" 8" AJAX with Air Clutch
1", 1¼", 2¾", 3", 3¼", 4", 5" Ajax
1¼", 4", 5" National

FURNACE—ANNEALING
Lee Wilson Annealing Furnace — Natural Gas Work Dimensions 42" Coil, 96" Piling Height

FURNACE—HEATING
Rockwell Rotary Hearth Gas Fired Forge Furnace

FURNACES—MELTING
2 ton Whiting Hydro Arc, Top Charge
4 ton Hercult, Side Charge, with Transformer
10 ton Elec. Furnace Co. Arc Melting Furnace

HAMMERS — BOARD DROP — STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELERS—ROLLER
54" Astna Standard 17 Rolls 4½" Dia.
72" H & J 9 Rolls 4½" dia.
72" Sutton, 23 Rolls 3½" Dia.
76" Voss-Ungerer, 23 Work Rolls 2.165" Dia. Capacity 22 to 12 Gauge Mild Steel

MULTISLIDE MACHINE
#35 U S Multislide Max. width of stock 4½" by .046 thick. Edgewise Stock Straightener

PLATE DUPLICATOR
Thomas Machine Mfg. Co. Plate Duplicator, Handles Plates 6' x 16'. Punch Capacity 6" Hole through ¼" Plate

PRESSES—HYDRAULIC
100 ton Southwark 4-Column, 14" Stroke Platen 18" x 24"
150 ton United Steam Hydraulic Forging Press "C" Frame, 18" Stroke, 24" Throat
350 ton Southwark 4-Column, 36" Between Columns, 24" Stroke, 96" Daylight
500 ton Wood 4 Columns, 24" Stroke, 72" x 96" Between Columns
1200 ton Birdsboro 4-Columns, 20" Stroke 30" x 36" Between Columns

PRESSES—INCLINABLE
No. 8 Bliss OBI, 90 ton, 6" Stroke
No. 6 Bliss OBI, 50 ton, 3" Stroke

PRESS—STRAIGHT SIDE
#10C Ajax 1000 ton Forging Press, Motor Drive

PRESSES—TRIMMING
No. 74½ Bliss 90 ton, 4" Stroke, 16¼ Shut Height
No. 75½ Bliss 110 ton, 4" Stroke, 18" Shut Height
No. 57 Toledo 150 ton, Bed Area 44" x 27"

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#2 Long & Allstatter Double End, Punch 1" x 1" #5 Wickes Single End 42" Throat 1¼" x 1"
Style W Cleveland Single End, 60" Throat, 313 Ton With Attachment for Dishing Heads

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Torrington Tandem Flattening Mill with Edge Conditioning Rolls, Flattening Rolls 8" x 4"
7½" Steckel Four High Rolling Mill
8" x 12" Blake & Johnson Single Stand Two High
10" x 14" United Three Stand Two High
12" x 16" Waterbury Farrel Temper Mill
12" x 16" Philadelphia 2-High Cold Rolling Mill
16" x 20" Lewis Two High Two Stand
20" x 36" Poole Two Stand Two High
36" Mesta 2-High Reversing Blooming Mill

SHEARS—GATE
90" x ¼" Birdsboro
8' x ¾" Cleveland
11' x 1" Garrison

SHEARS—ANGLE
6x6x⅝" Hilles & Jones
6x6x1" Long & Allstatter Size B
8x8x1" Long & Allstatter Size C

SHEARS—ROTARY
3/16" Quickwork Rotary Shear, 36" Throat
¼" Quickwork Whiting #25A with Circle Cutting Att.
¾" Kling #250, With Flanging Attachment
⅝" Quickwork Circle Shear 18" Throat, Circle Cutting Attachment

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8' x 3/16" Niagara 78B, Motor Dr. NEW 1951
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72" x 12 Ga. Niagara #46-B
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30" Yoder Coil Slitting Line, Uncoiler & Recoiler
38" Paxson Coil & Sheet Slitter
72" Yoder Sheet Slitter

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No. 9 Medart Continuous Automatic Straightening Machine. Capacity ⅝" to 1¼" Dia. Bars any length or up to 2" Tubing, Motor Driven
Kane & Roach 5-Roll Straightener, Capacity ⅝" to 1¾", Belted Motor Drive
No. 2 Taylor Wilson Straightening Sizing & Burnishing Machine, Capacity ⅛" to 1¼" Tubing
24" Haliden Automatic Strip Straightener & Cutting Machine
48" Cleveland Punch & Shear Works Strip Straightener & Cut-off Machine

TESTING MACHINES
5,000 lb. Olsen Hydraulic LaCap Universal
2,000 lb. Riehle Model PB-2 Universal
50,000 lb. Baldwin Southwark Comp. Testing Machine
60,000 lb. Tinius Olsen Universal Hydraulic
100,000 lb. Tinius Olsen Universal 4-Screw
150,000 lb. Tinius Olsen Universal 2-Screw
200,000 lb. Tinius Olsen Chain Testing Machine

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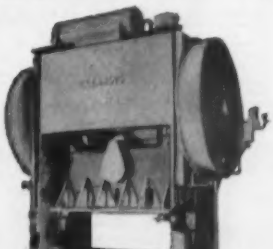

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1	900	Whse.		250	450/550
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1	1500	C.W.	514	30/115	4000/12000
1	1000	G.E.	900	260	6600
3	1000	G.E.	720	600	2300/4600
2	750	G.E.	720	275	2300/4600
1	750	C.W.	514	30/115	2300
1	600	G.E.	720	250	440/2300

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1	2500	Whse.	OISC	3	26400/13250x460
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1	300	G.E.	720	275	2300
3	200	G.E.	720	250	2300/440
1	150	G.E.	720	250	2300/440
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6*	800	Whse.	Mill	600
6	700	Whse.	Mill	285/700
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1	250	G.E.	MPC	325/975
1	300/350	G.E.	MPC	300/900
1	200	Whse.	Mill	300/1200
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Qu.	Kva	Make	Phase	Voltage
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3	500	G.E.	1	22,000/11,000-2300/4000
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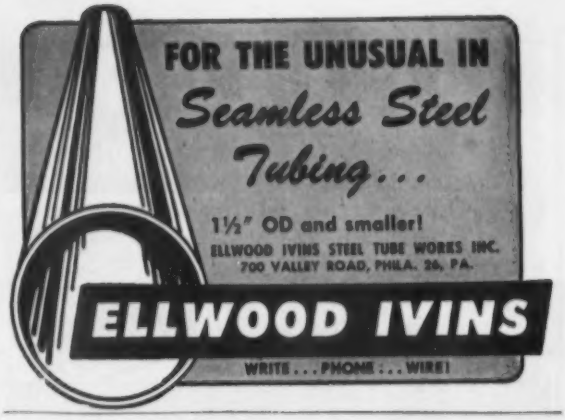
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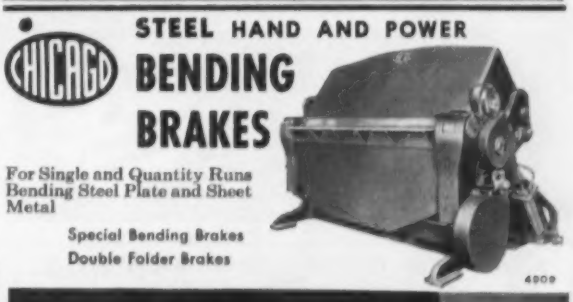

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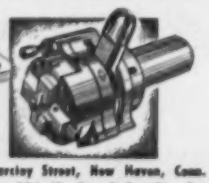
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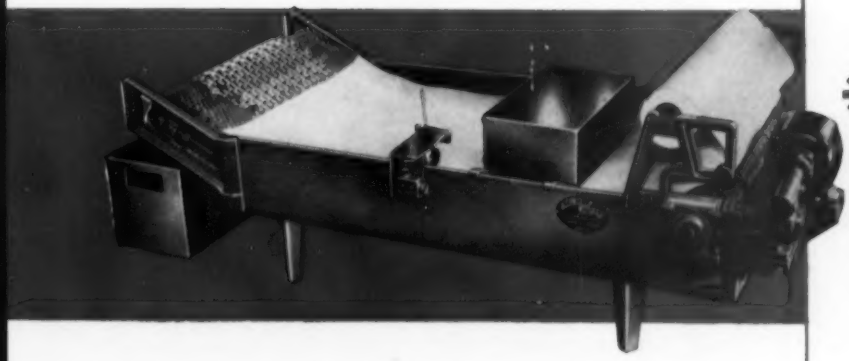

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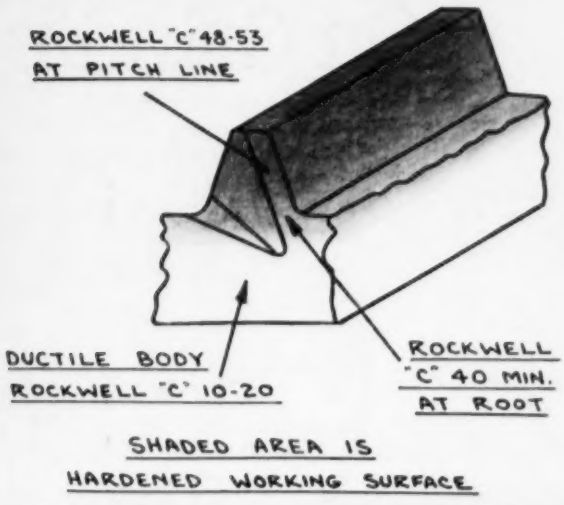

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